ECRM® RIP for the Macintosh

RIP Manual

Harlequin Eclipse Release™ SP4

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Harlequin RIP OEM Manual

Harlequin Eclipse Release SP4

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Preface

WELCOME to the ECRM Harlequin® PostScript® language compatible interpreter. This manual is a complete guide to using the RIP, and provides technical details when necessary. For details of how to install the RIP, see the separate *Installation Guide*.

This manual is intended for anyone using or evaluating the graphical user interface version of the ECRM Harlequin RIP for Classic Mac OS platforms. The guide covers the features of the RIP in a structured way, giving examples that show you how to perform a wide variety of useful tasks in the RIP. For more details about the other versions of RIPs available, see Chapter 1, "Introduction to the Harlequin RIP".

Contents of this manual

This manual discusses basic concepts at an early stage, leaving more complex issues for the later chapters. In addition, each chapter starts with a basic description of the relevant features before describing in detail the more technical issues involved.

Changes to the Eclipse Release SP4 of the RIP include:

- The Output to TIFF section has been updated, see Section 4.8 on page 134.
- Changes have been made to the media saving module, see Section 4.15 on page 172.

- The way that the Minimum shaded fill levels work has been changed, see Section 4.23.11 on page 199.

Changes to the Eclipse Release SP3 of the RIP include:

- The addition of a control strip, see Section 4.19 on page 176.
- The addition of Enfocus preflight checking of PDF files, see Section 7.11.5 on page 309.
- RIP executables are supplied with associated shared library files, see Section 2.4 on page 83.
- The following options are added to the Media Saving section: Switch Roam Color to Black, Name Flat after and Tracking of media width to aid automatic cassette selection. See Section 4.14 on page 162.
- The addition of a control for the handling of features found in jobs from Adobe InDesign, see Section 4.24.3 on page 204.
- New options provided under Delete on error and a new Suppress on Startup option in the Spool Folder Configuration dialog box. See Section 7.4.1 on page 283.
- Extra information on PDF/X standards is provided in the Printing PDF files section, see Section 7.11.1 on page 302.

Changes to the Eclipse Release SP1 of the RIP include:

- Relocation of the `MediaSaving` directory.
- Additional font support.
- A change to the way image interpolation works.
- The addition of the Minimum shaded fill levels option.

Changes to the Eclipse Release of the RIP include:

- Harlequin ColorPro™ with new enhanced user interface.
- Support for N-color and Gray Profile ICC profiles.
- Press/Proof simulation added to color products (RGB proofing workflow).
- Black threshold parameter added to custom rendering intent GUI.

- ProofReady Plugin support on Mac OS X.
- Harlequin 1 bit and 2 bit EDS plugins.
- SetGold™ v1.2 and SetGoldPro™ on Win NT only.
- TrapPro™ trapping.
- Trap Zone support for PDF files.
- PDF/X-1a and PDF/X-3:2002 support.
- PDF 1.4 including: transparency, JBIG2, 128 bit encryption, output intents, and referenced PDF. Because of this, the InFlight checker has been removed.
- Support for Palette color (Index color) TIFF files.

Items which have been relocated in this version include:

- The **Color Options** button is removed from the Page Setup dialog box and is replaced by a **Color Setup Manager** and **Color Setup** dialog box.
- Trapping controls appear in the **Trapping** section of the Edit Page Setup dialog box.
- Ink set options have been removed from the **Edit Separations** dialog and placed within their own **Ink Set Manager**. See the *TrapPro User Manual* for more information.
- Honor Color Management (PDF and PS) options were previously in the **Page Setup > PDF Options** dialog and **Page Setup Options > Extras** dialog. The option is now called **Override color management in job** and is available in the Color Setup dialog.

Changes to v5.5r1a include:

- The addition of a Mac OS X version of the manual.
- A small number of corrections, deletions and additions, all highlighted by change bars.

Changes to v5.5r1 include:

- AcroForms support, see Section 7.11.4 on page 306.
- Convert RGB blacks to true black, see Section 11.3 on page 458.

- The way calibration works has been changed. For more information see Section 10.4.4 on page 385.

The following changes were made for v5.5.

- Image Interpolation support, see Section 4.4.2 on page 123.
- Media Saving feature, see Section 4.14 on page 162.
- PDF 1.4 InFlight checker.

Less significant changes include:

- Automatic creation of Font resources for installed CID fonts, see Section 9.2 on page 356.
- Font substitution changes, see Section 9.10 on page 367.
- Change to the messages when calibrating, see Section 10.4.2.2 on page 381.
- Changes to the PANTONE® MATCHING SYSTEM, see Section 11.1.2.1 on page 424.

The first three chapters contain information about what the Harlequin RIP does, and how to get it up and running on your machine.

Chapter 1, "Introduction to the Harlequin RIP", gives a description of what the RIP does and the kind of tasks for which you can use it. This chapter also gives a broad overview of the different versions of RIP that are available.

Chapter 2, "Running the Harlequin RIP", describes your machine requirements, and how to start up the Harlequin RIP once it is installed.

Chapter 3, "Getting Started with the Harlequin RIP", describes the most fundamental elements of the system. It shows you how to do useful work without learning a large number of new skills.

The next four chapters form a more comprehensive account of the software.

Chapter 5, "Harlequin RIP Output Methods", introduces the different ways in which the RIP can operate, and how you can get the best performance out of the software for the jobs you are running. The chapter moves from general principles to more specific examples of the best way to use the RIP.

Chapter 4, “Configuring Output Formats”, describes the flexibility the Harlequin RIP provides for configuring the appearance of any printed page. The tools described in this chapter will be used on a regular basis, and are important for anyone who will make extensive use of the product.

Chapter 5, “Screening”, explains the control the Harlequin RIP gives you over screening techniques. This chapter includes a complete description of using Harlequin Precision Screening.

Chapter 6, “Configuring the RIP”, shows you how you can configure the Harlequin RIP to give the best performance in your environment. You will probably want to experiment with the options described in this chapter, but once you are satisfied that the RIP is running as you want it, you will not need to alter them on a regular basis.

The later chapters of the manual deal with specific facilities that the Harlequin RIP offers, and may be used as reference.

Chapter 7, “Configuring Input”, describes the different ways in which you can send PostScript-language code and other forms of job as input to the Harlequin RIP, either working on a stand-alone machine, or as part of a network.

Chapter 8, “Media Management”, gives you complete details of the media management facilities available in the Harlequin RIP.

Chapter 9, “Fonts”, describes the use that the Harlequin RIP makes of fonts, the different font formats that are available, and the special built-in facilities that the RIP has to make handling fonts easy and more efficient.

Chapter 10, “Calibration”, discusses the ways in which the Harlequin RIP can help you ensure accurate calibration of your output.

Chapter 11, “Color Separation”, describes the facilities the Harlequin RIP provides for controlling the printing of individual colorants in both composite and separated output.

Appendix A, “Troubleshooting”, provides solutions to common problems that occur when running the Harlequin RIP.

Appendix B, "Jobs Containing Color Management Data" describes how jobs and images with attached color management data interact with related settings in the Harlequin RIP.

Appendix C, "Using Genlin" describes a utility program providing semi-automatic measurement of calibration targets generated by the Harlequin RIP.

Appendix D, "Harpoon PCI Screening Accelerator" describes a combination of hardware and special control software able to provide screened output at rates higher than those possible with software alone.

Finally, the "Glossary" explains terminology used throughout the manual.

Assumptions

The Harlequin RIP runs in the Mac environment. It is important that you are familiar with your version of Mac OS, at least to the level of using the Finder and a simple text editor or word processor such as SimpleText. If you are not, please refer to the appropriate Apple manuals, online Guides, or Help systems.

In complex installations, you may wish to send jobs between PCs, Macintosh computers, and computers running the UNIX operating system. This manual describes the details special to the Harlequin RIP, but not the fundamentals of networking connections and services. You are likely to require assistance from technical support staff for initial configuration and occasional maintenance of such installations.

Conventions

This manual uses some conventions to make it clear where you give keyboard commands or choose from the menus and dialog boxes, as described in the following sections.

The keyboard

You can execute many of the commands available in the Harlequin RIP either by using the mouse or by using a *keyboard shortcut*. This is a combination or

sequence of key presses that executes a command without you having to choose a menu option with the mouse. Keyboard shortcuts for individual commands are discussed, in context, throughout the manual.

The Shift key is often used when selecting a group of objects from a list. For example, when selecting a group of files to print. It is also used in keyboard shortcuts and in some mouse actions.

The Command key is used in keyboard shortcuts and in some mouse actions. For example, you can often hold down Command while pressing another key or a mouse button. Whenever this manual describes one of these actions, the text shows which key or mouse button to use: for example, when you can use the Command key and the letter key K in combination, the text shows Command-K.

The Command key is also used when selecting several objects from a list that do not form a contiguous block. For example, you can use this key when selecting a number of files to print.

Some keyboard shortcuts are specific to a particular window and only operate when that window is active. When using a windowing system, ensure that the relevant window is active before using one of these keyboard shortcuts.

Fonts and formats

The following fonts and styles are used throughout this documentation.

1. Paragraphs that are numbered and use this font contain instructions which you should follow in the shown order.

Text written in this **sans-serif bold** face represents a menu title, a menu item, or a control item in a RIP dialog box. Text including an angle bracket (**>**) indicates both a menu and the option in that menu. For example: “choose the **Harlequin RIP > Start Inputs** option” is a shorthand method of referring to the **Start Inputs** menu option in the **Harlequin RIP** menu.

Text written in this `typewriter` face represents a piece of PostScript-language code, a file name, or text displayed by the Harlequin RIP.

If a term is written in *italic*, it is the first mention of an important concept. This concept is explained in the text immediately following, in the glossary, or both.

Note: Text indicated by starting with a bold word in the left margin is important and should be read carefully. A Note, like this one, is often a suggestion that may save you work, improve performance, or improve the quality of output.

Warning: Like a Note, a Warning is important and often indicates the need for care to avoid loss of files or settings.

5

Harlequin RIP Output Methods

This manual uses the term *throughput* to mean the productivity of your RIP workflow— how much work you are completing in a given time. The Harlequin RIP provides a comprehensive set of tools that allow you to maximize your throughput.

5.1 Historical overview

The Harlequin RIP is able to overcome many of the problems which have beset traditional PostScript-language compatible RIPs.

RIPs have traditionally operated in a serial fashion—that is, the RIP processes a page of PostScript language and then outputs it, then processes the next page and outputs it, and so on.

The Harlequin RIP can operate in this manner. This approach to processing (which includes both interpreting and rendering) and output is usually adequate with low to medium resolution devices.

However, with higher resolution devices this approach becomes wasteful, because periods are spent with the output unit idle while the RIP is working, and then with the RIP idle while the output unit is working. The RIP allows you to overlap processing and output for greater throughput.

Also, if you need to change cassettes or deal with a printer fault or media jam, most RIPs must wait until the fault is cleared before they can output the current page and continue. If you are processing a long job and a fault occurs, it must be reinterpreted once the fault has been detected. For an overnight job, the fault will probably not be detected until the morning, in which case a lot of time will have been wasted.

5.2 Page buffering modes

The Harlequin RIP overcomes these limitations by allowing you to choose one of four different modes of operation. Depending on the job involved, and the configuration of your hardware, you can choose whichever mode is most suitable and overcome many of the problems described above.

There are two general methods of operation in the RIP—*multiple* and *single*. Multiple modes allow you to write each interpreted page to disk, ready for later printing and reprinting. Single modes only interpret one page before printing must occur (and hence make the RIP operate in a more traditional manner).

The four specific modes are: *Single*, *Single (if required)*, *Multiple*, and *Multiple (Parallel)*. Table 5.1 introduces and compares these modes.

Table 5.1 Comparison of page buffer modes

Mode	Behavior
Single (if required)	Only buffers a page to disk if the page is too complex to process in working memory—deletes this buffer after printing. Otherwise, sends output directly to the output device.
Single	Always buffers a page to disk before printing it. Deletes the page after printing.
Multiple	Always buffers a page to disk before printing it. Retains on disk all pages created for a job, for ease of reprinting.

Table 5.1 Comparison of page buffer modes

Mode	Behavior
Multiple (Parallel)	Always buffers a page to disk before printing it Retains on disk all pages created for a job, for ease of reprinting. Sends interpreted pages to the output device while interpreting other pages at the same time.

Note: For normal use, you should use Multiple (Parallel) mode. This gives the best overall performance from the RIP and the best control over every page processed. The RIP uses this mode by default.

Refer to Chapter 6, "Configuring the RIP", for details of how to select different page buffering modes in the RIP.

5.2.1 Operating modes

Figure 5.1 presents an overview of the behavior of the Harlequin RIP in the single and multiple modes.

When the RIP is in either of the single modes, it sends each page straight to the output device once it has been interpreted. If the RIP buffers a page to disk, that page buffer is deleted once the page has been printed.

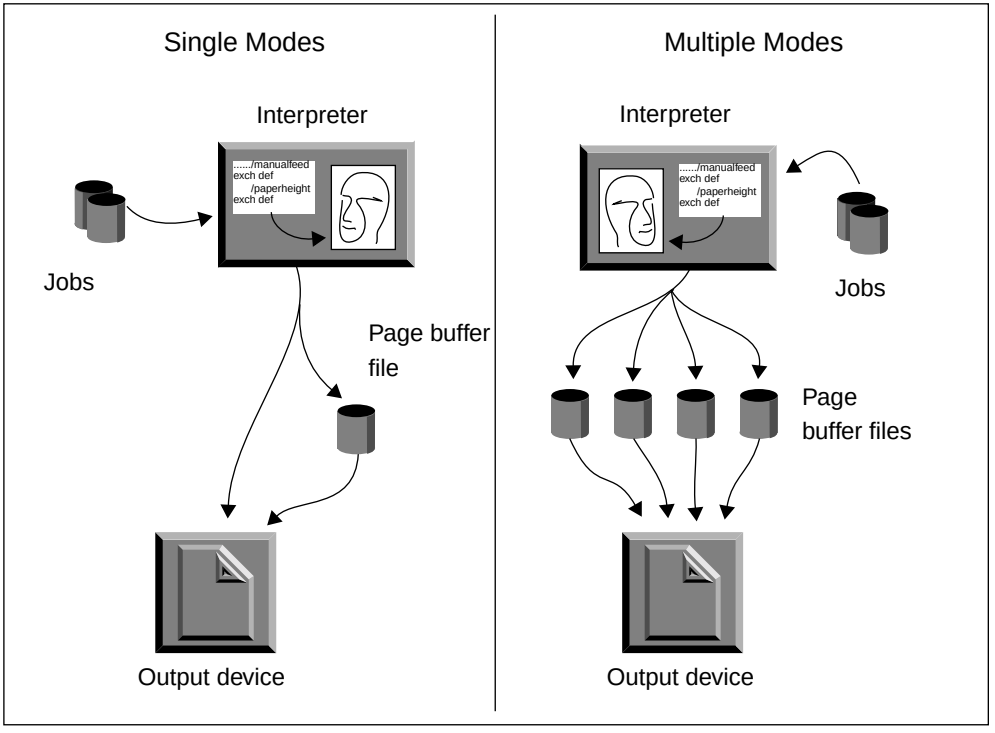


Figure 5.1 How the Harlequin RIP behaves in Single and Multiple Modes

When in one of the multiple modes, pages are always buffered, and they are not usually deleted (until disk space is required for new pages) so they can be reprinted at a later point. The throughput system tools can be used to oversee printing—allowing a range of benefits, which are described below. See Section 5.3, “The throughput system”.

Note also that when in Multiple (Parallel) mode, interpretation can take place at the same time as outputting an earlier page to a printer or imagesetter, but this is not true of either of the single modes. This is not illustrated in the diagram.

Even though the increase in job throughput is significant when in Multiple (Parallel) mode, there may be cases—usually because of hardware limitations—when you will need to use one of the other modes provided. For example, you may not have enough disk space to store any page buffers, or the combination of a slow disk and an output device with a high data rate may mean that working in Multiple (Parallel) mode becomes impractical. See Section 5.3 for more details.

5.3 The throughput system

This section describes the Output Controller, which is the central part of the throughput system, and discusses how it can be used to increase throughput. The Output Controller is available when either of the multiple modes is selected (see Section 6.3, “Control of page buffering modes”, for details on how to change the page buffer mode).

The Output Controller gives you powerful facilities for controlling any jobs output by the RIP. These include:

- Reprinting without reinterpreting the original page description.
- Changing the order of the pages to be printed.
- Control over a variety of page characteristics without reinterpreting the page description.
- Aborting any page before it is completely printed.

5.3.1 Output Controller

To display the Output Controller (if it is not already displayed), select **Output Controller** from the **Output** menu, or type Command-O. It will appear as a separate window on your screen, as shown in Figure 5.2. If you want to remove

it, choose the menu option again. By default, the Output Controller is displayed when you start up the RIP.

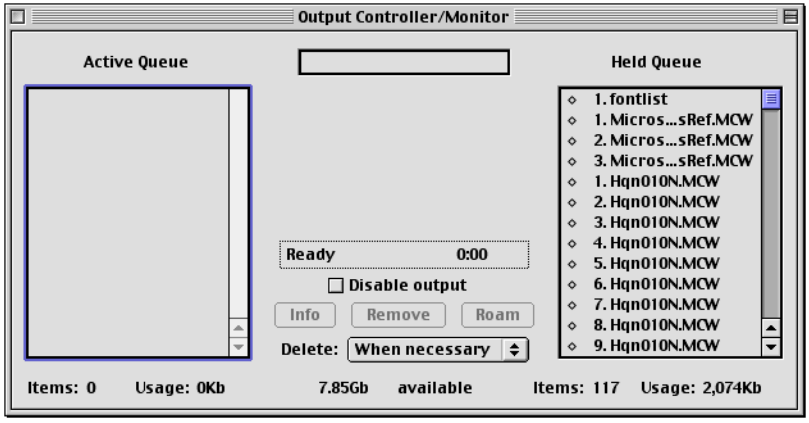


Figure 5.2 Output Controller / Monitor dialog box

5.3.1.1 The Active Queue and Held Queue

The **Active Queue** and **Held Queue** in the Output Controller can contain a number of items, each representing a page of output.

The **Active Queue** contains pages which are currently queued for printing. Pages listed at the top of the **Active Queue** will be printed first.

The **Held Queue** contains pages which are being held on your hard disk. They may have already been printed, or you may have moved them there yourself. (See Section 5.3.1.3).

The number of items in a queue, together with the amount of disk space they use, is displayed below each queue.

If a page is currently being printed, it is shown in the box at the top of the Output Controller between the **Active Queue** and **Held Queue**.

As pages are printed, there is a constant flow from the **Active Queue** to the **Held Queue**. After a page has been interpreted, it will be placed at the end of the **Active Queue**, printed in its turn, and then transferred to the **Held Queue** where

it will be retained until disk space is needed for new pages, when it will be automatically deleted. This is illustrated in Figure 5.3.

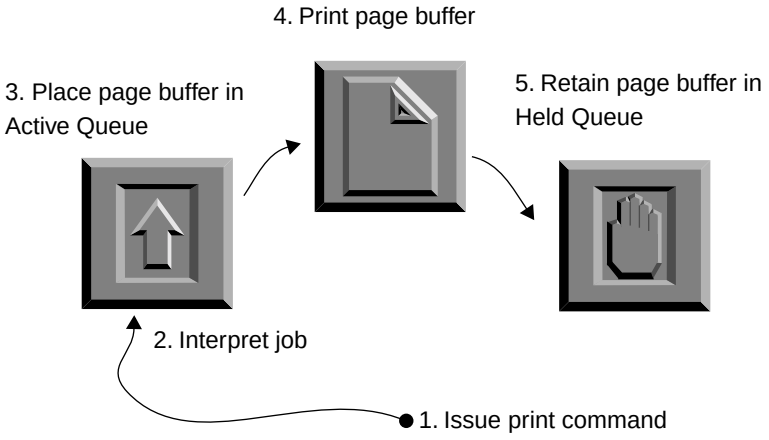

4. Print page buffer
3. Place page buffer in Active Queue
5. Retain page buffer in Held Queue
2. Interpret job
1. Issue print command

Figure 5.3 Flow of a page buffer between the active and held queues

5.3.1.2 Interrupting output

The **Disable output** check box can be used at any time to stop printing. When it is selected, pages will remain in the **Active Queue** until you clear the check box to resume the printing.

Disable output does not stop the current page printing, if there is one. To stop a page while it is printing, drag the page name from the top box into the **Held Queue** or **Active Queue**.

If pages are interpreted while output is disabled, the new pages created are added to the **Active Queue** as normal. Disabling output does not prevent you from processing jobs.

You will find **Disable output** useful if you need to renew the media in an output device, or if there is a fault on a device, but you wish to continue interpreting and preparing more pages for output.

The RIP automatically disables output when certain errors occur, for example if a device determines that the wrong cassette is mounted.

5.3.1.3 Moving page buffers

You can move any of the pages shown in the Output Controller between the **Active Queue** and **Held Queue** by selecting and moving them with the mouse.

To move a page buffer, do the following:

1. Select the desired file.
2. Holding down the mouse button, drag the file between the queues.

The selected page will move with the mouse pointer and enter the list at the position where you release the mouse button.

If you wish, you can move a block of several pages at once. To select a block, select the first one, then hold down the Shift key and select the last one.

You can also select several page buffers which do not form a contiguous block. Hold down the Command key while selecting the page buffers.

You can reprint or abort a job, or reorder the pages in the queue, easily and quickly, by moving the pages between the queues, as follows:

- To reprint a page, move it from the **Held Queue** to the **Active Queue**.
- To stop a page before it is printed, move it from the **Active Queue** to the **Held Queue**.
- To abort the page that is currently being printed, move it from the box between the queues to the **Held Queue**.
- To change the order of the pages in a queue, move them within the queue.
- If you are moving a lot of pages at once, disable output first to ensure that none of them are inadvertently printed before you are able to move them.

5.3.1.4 Page buffer information

Information about each page is displayed in the **Active Queue** and **Held Queue**. Refer to Figure 5.2 on page 24 to see examples of this. The following items of information are displayed:

- The delete permission for each page.
- Whether or not the page was created by an older version of the RIP.
- The page number of the original job.
- The original job name.
- The color for printing the page.

The delete permission for (or origin of) each page

You can configure the RIP so that it automatically deletes pages once they have been printed, or when space on the hard disk is low. However, you can still retain an important page by changing its delete permission. See "Deleting buffered pages" on page 30, for details on deleting pages automatically, and "Operations on buffered pages" on page 31, for details on retaining important pages.

The mark, if any, to the left of each page in the **Active Queue** and **Held Queue** indicates its delete permission.

♦—The page is locked and cannot be deleted automatically

◊—(no mark) The page is unlocked and can be deleted automatically

<—The page was created in an earlier version of the Harlequin RIP

Note: The Harlequin RIP version 5.0 and later can read page buffers created by version 4.5, and you can roam or print these buffers. The mark (<) in front of the name of an older buffer is there to remind you that there are some limitations on what you can do with earlier versions of page buffers: see Section 5.3.3 on page 37 for details.

The page number of the original job

The page number of the original job from which the page buffer comes is displayed on the right of the delete permission.

For example, if you are producing separated CMYK color, the RIP produces four monochrome pages for each original page of the job. The first four pages represent the Cyan, Magenta, Yellow, and Black separations for the original page 1. The next four represent the CMYK separations for the original page 2, and so on. Separated pages produce pages with the original number labeled by color. Thus the four separations for page 1 are called `1. Jobname (C)`, `1. Jobname (M)`, and so on.

If you only print a range of pages from a document, they are labeled in the original job from 1 upwards, rather than with the true page number in the document. For example, pages 3 through 7 of a document are labeled from 1 through 5 in the job.

The original job name

The name to the right of the page number is the job name. This is not necessarily the same as the file name of the job.

If the job name for a PostScript-language job is not specified in the page description, then one of the following will apply:

- If the input came from a file, the file name will be used.
- If the input came from the *Executive*, then the value of `%exec%` will be used.
- If the input came from an AppleTalk network, then the value of `%ip:`*`atalkname`*`%` will be used. The *`atalkname`* is the AppleTalk printer it came from.

For other types of jobs, the file name will be used.

The color for printing the page

Color separation pages in the Output Controller are labeled with their separation name (for example: `C`, `M`, `Y`, or `K`; or the spot color name), or `Composite` if there are several colors on one page, for example when using the `PackDrum` page feature. (`PackDrum` is intended for use with drum imagesetters, and it is an example so you must add it before use, as described in “Features” on page 191.)

5.3.1.5 Monitoring progress

The Output Controller can be used to monitor the progress of each page as it is printed: the large box between the two queues gives you an indication of the progress of the job. As soon as a buffer begins to print, the shape of this progress box changes to reflect the aspect ratio of the page. For instance, if it is a portrait page, the box will have greater height than width, and if it is a landscape page, it will be wider than it is high.

As the page is printed, the box starts to fill from the top with a light gray pattern, followed by dark gray. Figure 5.2, page 24, shows this happening.

- The amount of dark gray in the progress box indicates the proportion of the job that has already been printed.
- The amount of light gray in the progress box indicates the proportion of data currently in the printer buffer, waiting to be printed.
- The amount of white space in the progress box indicates the proportion of data not yet printed and not yet buffered.
- When the progress box is completely filled with dark gray, the page has finished printing, though margins and extra feeds may require a few more seconds.

In addition, the time taken for the current page buffer is displayed in the message area below the progress box.

Some printers may also buffer the data internally, so they may not start printing until some or all of the data has been received.

The message area and the progress box are both used to display additional information when problems arise. For example, if your printer becomes low on media, an icon will be displayed in the progress box, together with an appropriate status message. See Appendix A, “Troubleshooting”, for a full description of these error messages.

Note: In either of the single modes, the Output Controller is not available and the progress box appears in a separate window.

5.3.2 Job management

The Output Controller gives you control over a variety of page attributes. Using the Output Controller you can for example:

- Ensure that certain pages will never be automatically deleted.
- Specify the number of copies of any page to print.
- Change individual page characteristics without having to interpret the job again.

There are two general methods of controlling these attributes: configuring the RIP so that it carries out certain tasks automatically, and changing them yourself.

5.3.2.1 Deleting buffered pages

When the RIP is in either of the multiple page buffering modes, pages are kept buffered on disk. When the hard disk fills up, however, there is no room for new pages, and so the RIP cannot interpret any further jobs. To proceed, the RIP deletes some existing pages to make room for new ones.

The pop-up menu labeled **Delete** in the Output Controller lets you specify one of three strategies to follow. Choose whichever option you prefer.

- The default strategy is `When necessary`. As disk space is required for new page buffers, the oldest ones will automatically be deleted from the **Held Queue**. Pages which have been locked will not be deleted. (See Section 5.3.2.4, “Locking important pages”, for details of how to lock pages.) The amount of hard disk space currently available is displayed at the bottom of the Output Controller, so you can tell when old page buffers are likely to be deleted. (The number displayed does not include any space you have reserved for the system—see Chapter 6, “Configuring the RIP”).
- Choosing `Always` will cause pages to be deleted immediately after they have been output. This means that page buffers will never be retained for reprinting, unless they have been locked before printing was completed. (See Section 5.3.2.4, “Locking important pages”, for details of

how to lock pages.) When switching to `Always` from another strategy, any unlocked pages in the **Held Queue** will be automatically deleted if you answer yes to a prompt.

- Choosing `Never` will cause pages to be locked as soon as they have been output, which means that they will never be deleted automatically. If this strategy is used for long periods of time, the hard disk will eventually fill up, and no more jobs will be processed until you manually remove pages or otherwise create more disk space.

Note: The option `When necessary` offers a good way to retain newer page buffers and manage disk space automatically. If you choose `Never` or `Always` for some special purpose, we strongly suggest that you return the setting to `When necessary` as soon as possible—the RIP remembers and uses the option you choose for **Delete**, even between RIP sessions.

In `When necessary` and `Always` modes, it is possible for the RIP to get so far ahead of the output device that the disk becomes filled with pages in the **Active Queue**. In this case, the RIP will temporarily suspend creating more pages until some of the existing ones are output and can be deleted to allow it to continue. The RIP Monitor window displays a message warning that the system has temporarily run out of disk space.

If disk space runs out when there are no pages that can be removed and no pages still to be output, the RIP will continue anyway, and if the disk reserve is used up then it will abort the job.

5.3.2.2 Operations on buffered pages

There are a number of useful tasks that you can perform on buffered pages, as listed below. Some of the options are only available for pages which are not currently being output or when no pages are being output.

Using the lists of page buffers, and the **Roam** button, you can:

- View pages on the screen.
- Select several color separations and view them on the screen.

Using the **Info** button and the Info dialog box, you can:

- Lock and delete page buffers.

- Print multiple copies of page buffers.
- Change a page to print in negative or vice versa.
- Change the exposure with which page buffers are printed.
- Trim excess white space from the output.
- Select the output device and cassette for page buffers (when appropriate).
- Set margins and center the page on the media (when appropriate).
- Change the colors used to Roam page buffers.

You can apply these changes to the selected page only, or to all the pages of a job.

These options are available in the Info dialog box. (Some options can be unavailable: either temporarily while you are Roaming a related page buffer or permanently because the output plugin requires particular settings.) Display the Info dialog box by selecting a page and pressing the **Info** button, or by double-clicking on the page.

Note: The Harlequin RIP version 5.0 and later can read page buffers created by version 4.5. The mark (<) in front of the name of an older buffer is there to remind you that there are some limitations on what you can do with earlier versions of page buffers: see Section 5.3.3 on page 37 for details.

5.3.2.3 Viewing pages with the Roam function

You can view one page or several pages or separations at the same time.

By selecting one page buffer and clicking **Roam**, you can preview the selected page. This prevents wasted film and time by letting you check that an image has processed correctly before it is printed. While roaming a page, the RIP is still able to process other jobs, but not to output them. You cannot roam a page while the RIP is outputting, so you should disable output when using **Roam**.

To roam more than one page at once, select all the pages you wish to view and click **Roam**; the selected pages will be overlaid in the Roam window. For example, this allows you to preview all separations of a color image together. Remember, you can select several buffers using the Shift and Command keys.

When viewing a higher resolution image, the **Roam > Reduced Roam** menu option is probably available. It allows you to see more of the image in one view. You must close the Roam window (and the Reduced Roam window if you opened it) before you can roam another page.

For more details about the Roam function see “Roam and Preview windows” on page 128.

5.3.2.4 Locking important pages

To lock a page buffer so that it is not deleted by the RIP when disk space is low, select the **Don’t delete page** check box in the Info dialog box. Page buffers which have been locked in this way are displayed in the Output Controller with a mark on the left of the job name, as described on page 27.

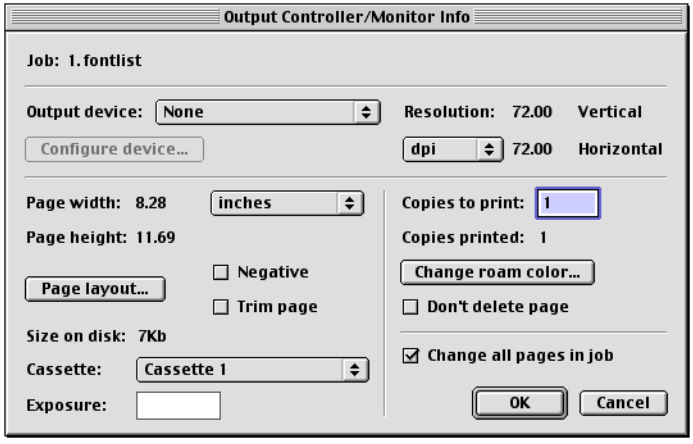


Figure 5.4 Info dialog box

You can delete any buffers from the hard disk—whether locked or not—by selecting them and clicking on the **Remove** button in the Output Controller. A warning dialog box appears which lets you cancel the operation if necessary.

5.3.2.5 Printing multiple copies

Multiple copies of any page buffer can be printed by specifying the number of copies required in the **Copies to print** text box of the Info dialog box for the appropriate page buffer. The next time that buffer is printed, the specified

number of copies will be produced, with the number in the **Copies to print** text box reducing with each copy until the value is 1. The **Copies printed** value keeps count of how many pages have been printed in total.

5.3.2.6 Printing in negative

You can produce a negative copy of a positive page buffer or a positive copy of a negative page buffer by selecting the **Negative** check box in the Info dialog box. The default value taken by this option is the one specified in the page setup for the selected job; for instance, if the page setup specifies negative printing, you can use this option to produce a positive copy. See Chapter 4, "Configuring Output Formats", for details of page setups and how they are defined.

Note: If you have calibrated your output device, selecting this option from the Info dialog box may produce incorrectly calibrated output. If so, select the **Negative** option in the Edit Page Setup dialog box instead, and output the job again.

5.3.2.7 Getting rid of blank space

You can trim white space from the top and bottom of a page by selecting the **Trim page** check box in the Info dialog box. The default trim page setting is specified in the page setup for the selected job. See "Other options that save media" on page 172, for details. Trim page is switched off as a default.

5.3.2.8 Changing the output device or cassette

You can change the selected output device or cassette for a page by choosing the one you want in the **Output device** or **Cassette** pop-up menus of the Info dialog box. Next time the page is printed, the new output device or cassette will be used. The default value taken by these options is the one specified in the page setup for the selected job. See Chapter 4, "Configuring Output Formats", for details.

Only output devices suitable for the page buffer are shown in the Info dialog box.

5.3.2.9 Changing the exposure

If an appropriate output device is selected, you can change the exposure for the selected page. Type in the new value in the **Exposure** text box of the Info dialog box. Next time the buffer is printed, the new exposure value will be used. You should consult the documentation for your output device to find appropriate exposure values, and also see Chapter 10, “Calibration”.

5.3.2.10 Changing the color

You can specify the color of a job separation to roam from the Info dialog box. Click the **Change roam color** button to use the Change Roam Color dialog box, as described in Section 11.11.3 on page 467.

When roaming color images, this lets you assign different colors to different separations and view the resulting image without having to interpret the job again.

5.3.2.11 Specifying page layout

You can change a variety of margin settings for a page buffer by clicking **Page layout** in the Info dialog box. The Page Layout dialog box will then be displayed, as shown in Figure 5.5. It is the same as the Page Layout dialog box

that you can display by clicking **Page layout** in the Edit Page Setup dialog box, as described in “Default page size” on page 173.

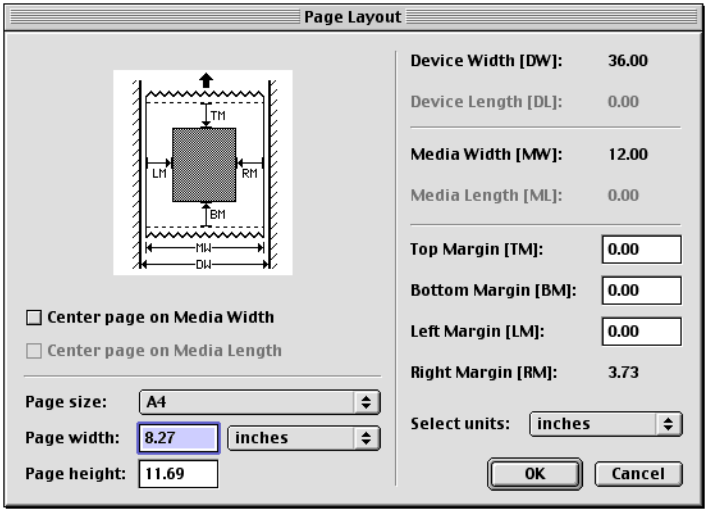


Figure 5.5 Page Layout dialog box

This dialog box allows you to change the margins for the selected page buffer. Type the margin size you want into the appropriate text boxes. You can choose the units of measurement you require from the **Select units** pop-up menu. In addition, you can center the selected page on the media by clicking on the **Center page on Media Width** and **Center page on Media Length** check boxes. The default value for each option is taken from the page setup for the selected page buffer. If you override any of these values, they will take effect next time you print the page buffer.

Some of the fields in the Info dialog box may not be editable, depending on the type of device.

5.3.2.12 Changing attributes for the whole job

Each of the options described above only affects the selected page buffer. However, many jobs consist of more than one page, and very often you will want to make the same changes to all of the page buffers produced by the job, not just one. Making changes to each buffer individually can be tedious, if not

impractical, so an option is available which allows you to change all the page buffers produced by a job at once.

To propagate changes in the current page to all other pages produced by the job, make your changes for one page buffer then select the **Change all pages in job** check box in the Info dialog box before clicking **OK** to close the dialog box. This change affects pages in both queues. If the current page is from a job currently being processed and pages are still being created, the new pages will get the new attributes if this option is selected.

5.3.3 Page buffers produced by older versions of the Harlequin RIP

The Harlequin RIP version 5.0 and later can read and print page buffers created by version 4.5. The newer installation of the RIP must have an output device that matches the output device used to create the page buffers. There are some limitations on what you can do with earlier versions of page buffers, depending on the way in which you access the older page buffers.

There are several ways to use older page buffers with a newer version of the RIP:

- You can copy the older page buffers into a special transfer folder used only for that purpose by the newer version of the RIP. This is the safest method because it avoids any interaction between the two versions of the RIP, but it uses more disk space and requires you to manage two page buffer folders in the newer version. Choose **Harlequin RIP > Configure RIP**, then click **Change** to change the folder used to hold page buffers.
- You can copy the older page buffers directly into the page buffer folder used by the newer version of the RIP. You may need to restart that version of the RIP before the RIP displays the page buffers.

  Warning: Take care not to copy page buffers with the same file names as ones already in the destination folder.

- You can leave the page buffers in the page buffers folder of the older version of the RIP. In the newer RIP version, choose **Harlequin RIP > Configure RIP**, then click **Change** to change the folder used to hold page buffers.

  Note: If you use Reduced Roam on a page first in the newer version of the RIP, this prevents you using Reduced Roam on *that* page in the *same* folder when using the older version of the RIP.

You can inspect the information displayed in the Info or Page Layout dialog boxes for an older page buffer but you cannot change anything. The main consequences are that you cannot change the number of copies to be printed and you cannot change the permission for automatic deletion.

You can Roam older page buffers without any problems beyond a small color change, which is most pronounced in continuous tone, unscreened page buffers.

5.4 Advanced details of page buffering modes

This section gives more details about each page buffer mode. As mentioned earlier, you should use Multiple (Parallel) mode whenever possible, but if this proves difficult, you can specify a different mode in the Configure RIP dialog box, described in Chapter 6, "Configuring the RIP".

Recall that a page is *buffered* to disk into a file of rasterized data, produced as the RIP interprets the data on the page. When the page has been interpreted, the data in the buffer file is sent to the output device and printed.

Using buffers on disk means that complex pages can be interpreted without requiring large amounts of working memory.

This section provides more specific details than the brief description in Section 5.2 on page 20. You may find this section useful if you wish to experiment with running the RIP in different modes.

5.4.1 Multiple (Parallel) mode

Multiple (Parallel) mode is a highly efficient way of increasing throughput, utilizing your computer to the full, and is the recommended mode for most cases. However, if you have an output device that can stop / start, you may

want to use the Single (if required) mode, especially if the data rate of the printer is high.

Interpretation of pages can proceed while other, already interpreted, pages are being output. In addition, multiple page buffers are created and saved on disk in this mode. These are not deleted after the pages have been output, allowing pages to be reprinted whenever necessary. This is extremely useful if a problem such as a developer jam occurs with the output device.

All the available processor time on your machine is used in this mode—priority goes to the task of sending bitmap data to the output device, and any processor time not used in that way can be used to interpret the next page of data.

It is possible for several pages to have been written to disk, but not yet sent to the output device. This may occur if there are pages which are quick to interpret, or if the printer is relatively slow or is not ready.

Eventually, of course, this will fill up the hard disk. When this happens, interpretation is suspended until enough pages have been output and deleted, or disk space has been freed up by another application. When the disk fills up, the RIP Monitor window displays this message:

```
System warning: Insufficient Disk Space
```

In Multiple (Parallel) mode, you can customize the RIP so that when disk space runs out, it automatically deletes pages which have been output. See Section 5.3.2.1 on page 30 for details.

5.4.2 Multiple mode

In Multiple mode, like Multiple (Parallel) mode, page buffers are kept on disk. (This is in contrast to the single modes, where only one page can be held on disk at a time.) Before reprinting, the Output Controller can be used to change many characteristics of the interpreted pages, meaning that time is not wasted in interpreting jobs again.

As in Multiple (Parallel) mode, it is possible that the hard disk will become full—you should ensure that page buffers are deleted when necessary to free up disk space. You can let the RIP delete pages for you, preserving important pages which you do not want deleted, or you can delete page buffers yourself whenever you want.

The main difference between this Multiple mode and Multiple (Parallel) mode is that interpreted pages cannot be output while other pages are being interpreted.

In Multiple mode, when a page is ready, interpretation is suspended until it has been output, in a similar fashion to the way the single modes operate. The advantage of Multiple mode over either of the single modes is that, because multiple page buffers can be written to disk, interpretation can continue even if the output device is not ready to accept data (for instance, if there is a media jam or if it has been turned off).

Multiple mode should be used if you experience a lot of *data underrun* in Multiple (Parallel) mode. This is only likely to happen with very complex jobs or an output device that requires data to be supplied at a very high speed.

Note: *Data underrun* occurs when an output device does not receive data to print at a fast enough rate. Some devices will signal an error and stop when this occurs. Others may continue to feed through media—with the consequence that large bands will appear in the output. Still others will attempt to stop and restart. This may result in a loss in quality of the image, and in any case is likely to be slower. For more information about using the Harlequin RIP with such printers, see “Using a printer that can stop / start” on page 258. See also “Printer buffer size” on page 263.

5.4.3 Single mode

When running in this mode, the RIP interprets a page of a job and sends it to the output device, then interprets the next page and sends it, and so on, until all the jobs specified have been printed.

Note: To run successfully in Single mode, as in Multiple mode, it is important that the RIP can send data to the output device as quickly as the output device requires it.

In this mode, the RIP always creates a single page buffer, sends the data in it to the output device, and then deletes the page buffer to make room for the next one. This means that you cannot use the throughput system tools.

By default, if a data underrun occurs and data cannot be read from the page buffer fast enough to keep up with the printer, the RIP tries once more to output the page and, if it still fails, aborts the job.

Note: The RIP does not display the Output Controller / Monitor in Single mode and Single (if required) mode.

In this mode, the **Output** menu contains a **Hold and Reprint** option. (You can also select this option by pressing Command-H.) Selecting this option allows you to choose whether or not to reprint each following page without having to reinterpret it. This can be used to print more copies of a page.

When you have selected the **Hold and Reprint** option, the RIP displays a dialog box at the end of processing each page—asking if you want to reprint the page. You can answer: **Yes**, in which case the RIP reprints the page and redisplays the dialog box; or **No**, in which case the RIP deletes the page buffer and interprets the next page.

Note: As a side effect of using **Hold and Reprint**, the RIP displays a harmless error message in the RIP Monitor window:

```
%%[PrinterError: re-print for hold and re-print]%%
```

5.4.4 Single (if required) mode

This mode is similar to Single mode, except that a single page buffer will be created *only when it is necessary.* The RIP will attempt to output a page to the printer without using a page buffer at all, but will create one in either of the following cases:

- It is not possible to interpret the page quickly enough to keep up with the printer, and the printer does not have a stop and restart function.
- All the available working memory on your computer has been filled by interpreted data before the page has been completed.

In the second case, the interpreted data is placed in a page buffer, thus freeing memory. More data is interpreted, and when memory is exhausted again the data is merged into the original page buffer, and memory is again available to continue the job. This process continues until all the data for the page has been interpreted, at which point the data in the page buffer is sent to the chosen output device, as for Single mode.

This mode is very productive but robust where there is an unpredictable mix of simple and complex jobs, and is especially useful when most jobs are relatively simple. It is productive because the RIP processes the simple jobs with-

out creating disk buffers and achieves maximum throughput for these jobs. It is robust because, when a job is complex enough to require buffering, the RIP creates and then sends the page buffer: this takes some extra time but the time is taken only when required.

In some cases, Single (if required) mode provides the quickest way to output a job.

The **Output** menu, contains a **Hold and Reprint** option, as described for Single mode.

5.4.5 Multiple (Parallel) compared to Single (if required) mode

The preferred mode for maximum performance and convenience is Multiple (Parallel) mode. The Single and Multiple modes will always be slower than Multiple (Parallel) mode: they are available only to help you cope with very demanding output devices that are not able to stop / start, when there is very little memory to use as a printer buffer.

However, in some circumstances, it is possible that the Single (if required) mode will be faster than Multiple (Parallel) mode. This is because the bitmap of an output page does not need to be compressed, written to disk, read back from disk and decompressed again, before being printed. If you run in Multiple (Parallel) mode, and the page buffer folder is on a RAM disk, the disk time required is minimal, but you still have to compress and decompress the page. It is a question of speed versus convenience. Multiple (Parallel) mode offers much greater convenience, and will usually also offer the best performance.

However, you should use Single (if required) mode if you are either only outputting a single page, (so there can be no benefit from the overlapping of outputting and interpreting) or if the time to compress and decompress the page to and from disk is large. This is true, for example, of the Seybold® *Rainbow Islands* test job, where 30% time savings are possible if Single (if required) mode is used at 2400 dpi.

The main problem with Single (if required) mode is that if the job is too complex, then the printer will catch up, a paint to disk will be necessary, and the page output again: wasting the time spent on the failed page and some media.

Another potential inefficiency of Single (if required) mode is that if the page is relatively simple, a lot of processing time is wasted when the page is outputting, which could be used to get the next page ready (as happens in Multiple (Parallel) mode).

5.5 Page buffering modes: a summary

The table below provides a summary of the major capabilities of each page buffering mode.

Will the Harlequin RIP…	Single (if required)	Single	Multiple	Multiple (Parallel)
Ever create a page buffer?	3	3	3	3
Always create a page buffer?	7	3	3	3
Ever create more than one page buffer?	7	7	3	3
Retain any page buffers on disk?	7	7	3	3
Always output as soon as a page is ready?	3	3	3	3
Always stop interpreting while outputting?	3	3	3	7
Interpret pages while outputting other pages?	7	7	7	3
Allow pages to be output again?	3	3	3	3
Allow modification of page buffer settings without reinterpretation?	7	7	3	3
Allow previewing the page?	7	7	3	3

Table 5.2 Summary of the capabilities of each page buffering mode

1

Introduction to the Harlequin RIP

This chapter provides an introduction to the capabilities of the ECRM Harlequin RIP, hereafter called the Harlequin RIP.

- Section 1.1 on page 45 defines the Harlequin RIP.
- Section 1.2 on page 47 describes the advantages of using the Harlequin RIP.
- Section 1.3 on page 48 describes various features of the Harlequin RIP.

1.1 What is the Harlequin RIP?

The Harlequin RIP is an application that takes a document or *job* describing images or pages and produces output from that job on an *output device*—which can be a printer, imagesetter, computer screen, or a file on disk. The term *output device* is used throughout this manual, except where the nature of the device is important.

In general, a software application or hardware device that performs this task is known as a Raster Image Processor (*RIP*) or, where the PostScript® language is involved, a PostScript-language compatible interpreter.

The Harlequin RIP is a software *RIP management system*. It contains both a software RIP and a collection of supporting functions that help the RIP per-

form its task efficiently. For example, the RIP accepts jobs from various sources, handles previewing and output of processed pages, and performs the associated file handling.

1.1.1 Input and output formats

The Harlequin RIP accepts jobs and produces output in several formats, with the exact options depending on your configuration of the RIP.

The range of input formats includes: PostScript-language and Encapsulated PostScript (EPS) files, Portable Document Format (PDF) files, TIFF/IT-P1 files, (16-bit) TIFF 6.0 baseline files, and JPEG and JFIF files. The Harlequin RIP supports modern versions of these files including PostScript LanguageLevel 3, PDF version 1.4, and derived standards such as PDF/X. The RIP also has controls for special handling of older versions of these files if necessary.

The Harlequin RIP can produce output in a variety of formats, to suit various physical output devices and file formats. The ability to produce TIFF 6.0 files is a standard feature but it is easy to add output options for other formats such as TIFF/IT-P1 files and *CIP3* PPF files. Similarly, there are options for output to many proofing printers and final output devices.

1.1.2 Versions of the Harlequin RIP

The Harlequin RIP is available in different configurations and is able to operate on different computer platforms. The configuration that is best for you depends very much on your individual needs. This manual should help you assess the functionality that meets those needs.

In particular, a version of the Harlequin RIP with a full graphical user interface (GUI) is available for: Power Macintosh computers running Mac OS 9 and Mac OS X; computers (PCs) using Intel or compatible processors and running, Windows NT, Windows 2000 and Windows XP (home and pro); and various computers running the UNIX operating system. The GUI version of the Harlequin RIP may be used on both single and multiple processor machines running the UNIX, Windows NT, Windows 2000 or Windows XP operating systems.

This manual describes the GUI version of the Harlequin RIP for the Power Macintosh running Classic Mac OS.

The Harlequin RIP is appropriate for a wide range of output devices including high-resolution imagesetters, lower-resolution plain-paper setters, and medium to high-resolution printers and plotters. It supports the special features of these devices, and maximizes their overall productivity.

1.2 Why use the Harlequin RIP?

The Harlequin RIP has proven itself to be a fast, versatile, and powerful PostScript-language compatible interpreter, and more. There are many reasons for choosing it above other similar interpreters, the most important of which are discussed here.

The Harlequin RIP is effective, compatible, and robust; and shows real benefits in everyday use.

- The Harlequin RIP is effective because it processes jobs quickly, is able to process jobs of virtually any size, and can re-output selected pages or a complete job without re-interpretation.
- The Harlequin RIP is compatible because it is kept up to date with: PostScript, PDF, and font specifications; image file formats; and relevant standards from independent bodies.

  Note: The Harlequin RIP is able to use proprietary extensions internally for quality of output, speed, and efficiency without losing compatibility.
- The Harlequin RIP is also compatible because it supports several networking protocols for use in many kinds of networks, whether or not all the computers are of the same type.
- Robustness comes from experience with many real jobs. You can configure the Harlequin RIP to override poor settings in incoming jobs (and avoid office printer quality screening on expensive media), use its ability to detect poorly labeled color separations, and so on.
- The Harlequin RIP is flexible enough to support many workflows, including: composite or preseparated color; PostScript, PDF, or TIFF/IT-P1. Some of these input formats require the Harlequin RIP options.

A system using the Harlequin RIP is easy to extend and to upgrade when necessary because the Harlequin RIP is a software-based RIP.

- You can add options, such as advanced screening, color management, and trapping. In many cases you can do this by entering passwords and in other cases with software-only procedures.
- You can add more output options with software plugins to support imagesetters, platesetters, proofing and display printers, and workflow integration.
- A PostScript-language programmer can add simple fragments of PostScript code to provide features such as marking pages with draft or similar overprint and color bars.
- It is possible to upgrade hardware and software independently. The Harlequin RIP is very similar on all platforms so there is little or no need for retraining if you need to add another type of computer.
- When you upgrade the Harlequin RIP you can transfer your existing settings to the new version of the RIP and most optional output plugins.

Section 1.3 discusses many of these features in more depth.

1.3 The Harlequin RIP in depth

Section 1.2 on page 47 described some of the advantages of using the Harlequin RIP. This section describes the features that contribute to those advantages.

- Characteristics of a software RIP. See page 49.
- File format and version support. See page 50.
- Extended color capabilities. See page 52.
- Screening options. See page 59.
- Harlequin ColorPro. See page 60.
- Graphics formats. See page 61.
- Input and output methods. See page 62.
- Complex jobs. See page 64.

- Throughput control. See page 64.
- Previewing. See page 65.
- Page buffer compression. See page 66.
- Fonts and font handling, including composite fonts. See page 67.
- Convenience features. See page 68.

1.3.1 Software RIPs compared to hardware RIPs

Many PostScript-language-compatible interpreters are based on hardware rather than software. That is, most PostScript-language printers come supplied with a RIP that runs on its own special hardware. Sometimes a RIP may run on only one type of printer.

The Harlequin RIP contains a software RIP, carefully written to support a number of computing platforms and output systems.

There are a number of advantages to using a software RIP:

- If you have a hardware RIP and wish to take advantage of new hardware, you must either pay for an upgrade of the old hardware or stop using it. With a software RIP such as the Harlequin RIP, you can use your old hardware for other purposes—you still have a usable computer. Thus, taking advantage of new technology in the hardware industry is much more cost effective if you have a software RIP.
- You can easily take advantage of new features if you have a software RIP. If new features are added to a hardware RIP, the only way to take advantage of those features is to buy the new version of the hardware, or to have a firmware upgrade. Both of these options incur considerable time and expense. Doing the same thing for a software RIP is much simpler and cheaper—improved versions of the Harlequin RIP can be run on the same hardware as older versions, and can be sent to you on disk.
- When you buy a hardware RIP, you buy a dedicated machine which is specialized for performing one task: interpreting the PostScript language. With a software RIP, the non-dedicated hardware you buy is a computer, which can be used for many purposes other than running the Harlequin RIP.

- It is much more expensive to customize a hardware RIP to individual requirements than it is to customize a software RIP.

Even if, despite these points, you feel that a hardware RIP is still the best solution for your particular case, it need not be traditional, dedicated hardware. It is possible to use hardware accelerators to assist a software RIP such as the Harlequin RIP.

1.3.2 File format and version support

The Harlequin RIP supports several file formats and maintains this support across the widely-used versions of these formats, as well as the latest versions.

Note: The Harlequin RIP limits all user created names or file names to 31 bytes. This is equivalent to 31 characters when using standard ASCII text, and 15 characters when using double-byte character sets, such as Kanji.

For example, the Harlequin RIP is a PostScript® LanguageLevel 3-compatible RIP management system but still supports features of PostScript Level 2 and earlier. The RIP also recognizes uses of PostScript code specific to common image creation and page layout applications.

The reason for supporting older versions of files and applications is that almost all PostScript-language and PDF page descriptions are created automatically by applications. Those applications can only use the features of the page description language as they existed at the time of writing the application, and those features are subject to change.

The PostScript language was first created and used in the mid-1980s and since that time it has undergone many improvements and changes. Throughout this period, people have been trying to create PostScript language page descriptions that, above all, *work*—despite any bugs in the interpreters which may have existed at the time.

To cope with this situation, the Harlequin RIP is compatible not only with the PostScript-language jobs of today, but with the jobs of yesterday. There are two aspects to dealing with older jobs: dealing efficiently with features that are now better supported by more modern versions of the page description language; dealing with work-around methods for bugs in older versions of the page description language. The Harlequin RIP does both.

It might not be immediately obvious why it is necessary to deal with bugs and work-around methods, but consider this example.

What happens if a bug is fixed in a widely-used PostScript language interpreter? Newer RIPs and applications no longer have to cope with that bug, but problems arise if you wish to interpret old PostScript language page descriptions (generated with an application written before the bug was fixed) with your new RIP. The old page descriptions take the bug into account, but the new RIP does not, so the hard copy produced with your new RIP is wrong. If your RIP cannot accommodate this, as the Harlequin RIP can, your old PostScript language files (and indeed your application if you still use it) are useless.

The input file formats that the Harlequin RIP supports are:

- PostScript LanguageLevel 3, Level 2, and Level 1.
- PDF versions up to and including PDF 1.4 files.
- PDF/X-1a:2001 and PDF/X-3:2002.
- JPEG and JFIF.
- TIFF 6.0 and optionally TIFF/IT-P1.
- GIF.
- PCL4.

See Section 4.23 on page 195 and Chapter 7, “Configuring Input” on page 273 for more details.

Note: RIP versions 5.3 and 5.5 included support for PDF/X-1:1999, this has been dropped in the Eclipse Release of the Harlequin RIP, and replaced with support for PDF/X-1a:2001 and PDF/X-3:2002.

The Harlequin RIP can also enable substitution of high resolution images for PostScript-language jobs, using an in-RIP implementation of the Open Prepress Interface (OPI), versions 1.3 and 2.0, and Desktop Color Separation (DCS), versions 1.0 and 2.0. See Section 4.21 on page 191 for details.

Additionally, the Harlequin RIP can be configured to support special features—color management, font substitution, duotones, and vignettes—of jobs

produced by several image creation and page layout applications. These applications include:

- Adobe Photoshop®
- Adobe Illustrator®
- QuarkXPress®
- Macromedia® FreeHand®

See Section 4.24 on page 200 for more details.

1.3.3 Extended color capabilities

The Harlequin RIP supports the use of color capabilities introduced with PostScript LanguageLevel 3. This support includes use of N-color or HiFi color systems using varying number of colorants, whether those colorants mimic CMYK systems (*photo-ink* systems) or use obviously different colorants.

The RIP provides separations management, preview, screening, calibration, and plugin support for the popular N-color systems.

The RIP also has the ability to calibrate and screen spot colors separately from process colors. This feature greatly simplifies the management of spot colors in the RIP.

1.3.3.1 /DeviceN and N-color

The `/DeviceN` color space allows better control of PostScript-language code in environments where the number of separations is no longer dominated by the CMYK, RGB, and monochrome color models. “N” represents the number of process color separations. Using the `/DeviceN` color space, CMYK corresponds to N=4, RGB to N=3, and monochrome to N=1. This color space allows the Harlequin RIP to access separations where N=2 (duotones) or greater than 4 (N-color).

The `/DeviceN` color space provides the functionality to support HiFi color or N-color systems where colorants in addition to CMYK enhance the attainable gamut of an output process. It also provides solutions for minimizing the number of spot colors required by an output device.

The Harlequin RIP version 5.0 and later uses this color space to extend separations management, Roam, and plugin capabilities. Depending on your specific device and workflow, additional plugin development may be required to make use of the expanded number of color channels.

1.3.3.2 Duotones, tritones, and quadtones

Some applications (for example, Photoshop versions 2.5 through 4) convert duotones involving spot colors to CMYK colors when producing composite PostScript-language jobs. While the composite output is correct, when such jobs are submitted to a RIP that uses in-RIP separation, the duotones are drawn on the process color separations and not on spot color separations as expected.

Photoshop 5.0 has the ability to produce spot color separations when in-RIP separation is selected for a LanguageLevel 3 RIP. This eliminates the problem just described for output generated by Photoshop 5.0 when sent to any LanguageLevel 3 RIP.

In addition to producing correct output from Photoshop 5.0 jobs, the Harlequin RIP correctly handles jobs from Photoshop versions 2.5 through 4 as well. The Harlequin RIP detects this construct in Photoshop jobs and correctly diverts the duotone to spot color separations. Note that you must configure the Harlequin RIP to generate these spot color separations for this to work.

For more information see Section 4.24.1, “Adobe Photoshop features”.

1.3.3.3 Patterns and Smooth Shades

LanguageLevel 3 implements new features that improve the quality of PostScript-language fills. In addition, it allows shades to be output smoothly at the resolution of the output device target. The RIP extends this capability by allowing for vignette replacement, in which existing vignettes in PostScript-language and PDF jobs are replaced.

This functionality greatly improves the quality of gradients and shades on output.

1.3.3.4 Images

The Harlequin RIP version 5.0 and later supports type 3 and 4 image dictionaries (for uses such as masks). This allows an application to produce masks using multiple images in a more efficient fashion. This mask technique also improves performance by eliminating the need for a detailed PostScript-language clipping path. This feature is best suited to lower-resolution output devices and workflows.

1.3.3.5 settrapparams

LanguageLevel 3 includes a new software interface that allows the description of trap settings within a PostScript-language file.

The Harlequin RIP version 5.0 and later incorporates the `settrappramss` interface and uses this for setting trapping parameters. Harlequin has extended `settrapparams` to include those trapping parameters that are not covered by the 3010 specification.

1.3.3.6 Type16 halftones

The Harlequin RIP 5.0 version and later supports type 16 halftones, which can contain more than 256 shades of gray. Harlequin has always supported an arbitrary number of gray levels, even in the PostScript Level 1 compatible RIPs. In the Harlequin RIP version 5.0 and later, this support for more shades of gray is also accessible using the LanguageLevel 3 constructs.

1.3.3.7 Idiom recognition

The Harlequin RIP version 5.0 and later uses idiom recognition to detect PostScript-language procedures and replace procedures that are bound when defined. This extends to procedures some of the benefits that Harlequin's `shadowop` operator provides for operator redefinition. Once the PostScript-language code is intercepted, the Harlequin RIP replaces it with optimized code.

This operator has many potential uses that include detecting level 2 code in a PostScript-language file and replacing it with LanguageLevel 3 code.

1.3.3.8 Type 32 fonts

RIP version 5.0 and later recognizes and supports Type 32 fonts.

1.3.3.9 Other operators

RIP version 5.0 and later supports the LanguageLevel 3 operators that are defined in the 3010 LanguageLevel 3 specification. The Harlequin RIP accepts PostScript-language output from applications using these LanguageLevel 3 operators.

PostScript LanguageLevel 3—3015—operators `setoverprintmode` and `currentoverprintmode` were included starting with 5.5r1a version RIPs.

1.3.3.10 File filters

The Harlequin RIP supports the required file filter additions documented in the 3010 LanguageLevel 3 specification.

1.3.4 Color, screening, and Roam functionality

RIP version 5.0 and later contains several new capabilities relating to color, screening, and roam. Where appropriate, Harlequin has taken care to enable the end-user to control the underlying functionality from the user interface.

Not all of the new functionality is applicable to all output devices or workflows. You will find some features more relevant than others for particular output devices and workflow instances.

1.3.4.1 Color API

Harlequin RIP version 5.0 and later contains a programming interface (API) that allows you to set the options for the Harlequin color management modules from PostScript-language code. This provides control over all color options, including the installation of ICC profiles, without a user interface.

1.3.4.2 Spot color screening and calibration

The Harlequin RIP version 5.0 and later has the capability to calibrate and screen spot colors as well as process colors. This feature greatly simplifies the management of spot colors in the Harlequin RIP.

1.3.4.3 UseCIEColor

This operator improves color control in the PostScript-language code by allowing device-dependent input data to be translated to a device-independent CIE color space. The input colors are mapped to the device-independent color space using an input profile. The colors may then be transformed ready for printing on another output device.

Harlequin has provided this functionality for some time through the color management modules the latest being ColorPro. You can choose to use the color management specified in the job by `UseCIEColor`, or to override this and instead use the more detailed controls provided with ColorPro.

1.3.4.4 Embedded ICC profiles

When ColorPro is enabled, the Harlequin RIP can detect and use ICC profiles embedded in Photoshop EPS, TIFF, or JPEG images. See the *ColorPro User's Guide* for details.

1.3.4.5 Colorimetric roam

Provided a system is using an sRGB display (monitor and display card) and the monitor is properly calibrated, Roam approximates colorimetric output on the display.

1.3.5 Memory management

Harlequin has a continuous program for improving the performance of the Harlequin RIP memory management. A new architecture has been put into place within the Harlequin RIP 5.0 and later for the Windows, UNIX (IRIX, Solaris), and Macintosh platforms. This architecture not only provides the groundwork for future memory features and enhancements, but also allows for a level of dynamic memory management within the Harlequin RIP.

There are new GUI controls for setting memory. As in the past, it is possible to specify the memory used by the Harlequin RIP, but there is a significant difference.

- In previous versions, the Harlequin RIP put a claim on the entire amount of memory specified so that the operating system and other applications could not use this memory even if the Harlequin RIP did not require it at a particular time. (The Macintosh implementation, because of operating system differences, varied slightly with respect to this functionality.)
- With the new implementation, the specified memory is not held exclusively for the Harlequin RIP. Instead, the Harlequin RIP takes only the amount of memory it requires at the time. This amount rises while processing a job but once the job is processed the memory is returned to the system. This allows the Harlequin RIP to co-exist better on a system with the operating system and other applications.

The new implementation also makes it possible to specify a reserve amount of memory, available for short-term use by the Harlequin RIP. For example, the Harlequin RIP may use this reserve in time-critical operations, where the alternative would be to use disk storage, as long as the reserve is large enough to keep the operation in memory.

1.3.5.1 Garbage collection

With the Eclipse Release of the Harlequin RIP, garbage collection has been implemented. Garbage collection is performed when memory is low and reclaims the memory occupied by composite objects that are no longer accessible to the PostScript program.

This helps some jobs that allocate a lot of memory, but not all. Some jobs that could not partial paint will now need significantly less memory than before.

When garbage collection starts, a message is displayed on the console window.

Garbage collection is controlled using the PostScript Language operator `vmreclaim`.

For more information on garbage collection, see section 3.7.4 of the *The PostScript® Language Reference* (3rd Edition).

1.3.6 Headless RIP Option

The headless RIP functionality that was introduced in Harlequin RIP versions 4.5 and 4.6 is also available in Harlequin RIP 5.0.

1.3.7 FlatOut

RIP version 5.0 and all subsequent Harlequin RIP 5 releases are capable of stitching single-page PGB files into a predefined flat. This feature enables the development of page-based workflows around the Harlequin RIP.

Three components are required to produce a stitched flat:

1. A background PGB file. You can create a background in a page layout application and then convert the PostScript-language code to a PGB using the Harlequin RIP. This flat background contains a slot for each page. This background may contain sluglines, crop marks, and so on.
2. Single-page PGB file(s). For example, to produce an eight-page flat, eight single-page PGB files must be generated.
3. A flat description file. This file describes the location of the background and single-page PGB files on disk. The flat description file also indicates the positioning of pages on the flat.

The flat description file is presented as an input to the Harlequin RIP and the PGB files are stitched into a single flat for output to the specified output device.

The Harlequin RIP version 5.0 and later accepts PGB files from Harlequin RIPs version 4.5. It also accepts PGB files from any other Harlequin RIP platform. This extends the ability to interchange PGB files between Windows platforms, which was introduced in the Harlequin RIP 4.5.

For additional information on how to generate a flat description and more on PGB stitching, please refer to the *FlatOut User Guide*.

1.3.8 Screening options

The Harlequin RIP has several screening features and options, designed to produce high quality output on devices ranging from imagesetters to inkjet proofing printers. There is generalized screening support for color systems that go beyond straightforward CMYK process colors, but you need an output plugin and device able to support these color systems.

The Harlequin RIP is able to create extra gray levels (with HPS) and to control the number of extra levels, even with PostScript Level 1 jobs. This feature helps to eliminate stepping in vignettes and to avoid posterization, while enabling you to set a limit on the number of levels that is appropriate to the required image quality. The RIP also supports more than 256 shades of gray when they are specified using PostScript LanguageLevel 3 constructs.

1.3.8.1 Harlequin Precision Screening

For very high quality output, Harlequin Precision Screening (HPS) has been produced. This is a proprietary feature that eliminates objectionable moiré patterning when producing color separations.

Once correctly set up, and with sufficient memory available, the Harlequin RIP can produce output with HPS at speeds comparable to those obtained when using traditional lower-quality rational tangent screening.

HPS has been designed for automatic operation, without the need to refer to complex tables of magic numbers, and you can choose to override any bad settings in the job. This is especially useful for print bureaus, who often receive PostScript-language code that is not set up for high quality screening.

1.3.8.2 Harlequin Screening Library

Global Graphics has developed a number of special screening strategies for very high quality press work, particularly when printing in color. They are included in the Harlequin Screening Library (HSL), and require separate passwords to become enabled.

HSL includes Harlequin Dispersed Screening (HDS), Global Graphics's patented Frequency Modulation (FM) screening technology. Moiré patterning is impossible with HDS, and it gives finer detail for a given device resolution.

Also included are Harlequin Chain Screening (HCS), which is particularly good at creating smooth flat tints and at holding detail in continuous tone regions, and Harlequin Micro Screening (HMS) which allows a greater range of tones to be used even at high screen rulings.

1.3.8.3 Screening for extended color systems

Several color systems require more than the four screens used for CMYK work. The Harlequin RIP contains screens suitable for use with HiFi color systems such as the PANTONE® Hexachrome Color Selector system or the various *photo-ink* technologies using different densities (light and dark versions) of one or more colorants.

1.3.9 Harlequin ColorPro™

It is possible to add and use the advanced color management facilities provided by Harlequin ColorPro which as an optional extra provided with the Harlequin RIP and requires a password for it to be enabled

ColorPro is a comprehensive color management system which replaces all the previous offerings such as HIPP, HCMS, HFCS and HCPS.

ColorPro together with SetGoldPro™ profile making software is Global Graphics' color science solution for ensuring color quality and accuracy for proofing and emulation. ColorPro provides the largest realizable color gamuts for the final print market and allows greater accuracy than would be possible using standard profiles.

Harlequin ColorPro embraces open systems, industry standards and device-independent color science, and is able to make full use of them. If you have ICC profiles with which you already achieve good results you can use these profiles with ColorPro. You should however be aware that ColorPro contains color science that is optimized for the Harlequin RIP and is easily utilized with the introduction of SetGoldPro.

ColorPro allows you to specify different gamut-mapping algorithms in the reproduction of a page. For example, you can simultaneously specify *Absolute colorimetric* to reproduce some elements of the page and yet specify *Perceptual* to reproduce the photographs. The end result is that, on a single page, the

color for photographs are each calculated without affecting other elements on the page.

Harlequin ColorPro allows processing of colors in page data using ICC profiles produced by OEMs, third parties, or end-users using third party characterization and profiling tools. ICC profiles specify a translation between two color spaces. Each profile is prepared for a specific set of imaging conditions. One device may have more than one profile. The profiles may correspond to running the device with different combinations of resolutions, inks, and paper.

New profiles can be easily added to ColorPro, and previously installed profiles can be selected without the need to reinstall each time a profile is used.

An option to uninstall ICC profiles is also provided.

In addition, ColorPro allows the use of profiles prepared in the Harlequin RIP format. Global Graphics supplies a number of profiles for commonly used systems.

When ColorPro is enabled, the Harlequin RIP can detect and use any ICC profiles that Photoshop has embedded in EPS, TIFF, or JPEG images.

This manual describes the Harlequin RIP without ColorPro, but mentions areas where ColorPro would modify your use of the Harlequin RIP. The extra facilities are described in the separate manual *Harlequin ColorPro User's Guide*.

For information on color facilities provided in the Harlequin RIP as standard see Section 11.8 on page 450.

1.3.10 Graphics formats

The Harlequin RIP can produce halftone output, 8-bit grayscale output, 8- and 10-bit run-length encoded (RLE) output, and color contone (continuous tone) output in N-color, CMYK and RGB formats. This allows the RIP to be used for driving contone color printers as well as imagesetters.

This output is passed to an output plugin (described in Section 1.3.11), and from there to the output device controlled by that plugin. Output devices are often physical printers producing images on paper or film; but devices can also be files on disk, storing the images in a specific graphics format.

An output plugin that creates disk files provides a simple method of translating from the input format to another graphics format. Using such an output plugin extends your ability to transfer graphics defined in the PostScript language or PDF to other software applications or systems. For example, you can produce a graphics image without dependencies on external fonts or color management. Also, you may wish to send a page description to someone who does not have access to PostScript-language tools but who can use files in the Tagged Image File Format (TIFF). TIFF is a commonly-used graphics format and a TIFF output device is supplied with the RIP.

1.3.11 Input and output methods

The Harlequin RIP performs most of its input and output using plugins, small auxiliary programs that the RIP loads when it starts up.

You can install new plugins into an existing installation of the Harlequin RIP to add new input and output capabilities. Several optional plugins are supplied with an installer program, and it is always better to use an installer if it exists, but the basic operation is file copying.

1.3.11.1 Output plugins

The RIP sends all output to printers and other output devices through output plugins, thereby allowing the quick and straightforward addition of support for new output devices.

Typical output plugins support single output devices or families of similar devices and may be supplied with special screens, calibration and color management, and other features appropriate to the device, such as control of exposure or cutting media.

Optional output plugins support file formats useful in workflow systems, advertising distribution, and setting up printing presses. These formats include TIFF/IT-P1 and the CIP3 Print Production Format (PPF).

1.3.11.2 Input plugins

Input plugins provide communication between the Harlequin RIP and other systems, primarily as sources of input.

The standard input plugins provided with the Harlequin RIP include:

- AppleTalk

  An AppleTalk network connects together a mixture of Apple and other computers and printers in order to share disk resources and printing services. AppleTalk runs on LocalTalk and Ethernet and is a widely supported network protocol.

  AppleTalk networks often include multiple printers, and are available to; Macintosh OS 9 users through a list in the Chooser desk accessory and, from Eclipse Release SP1, Mac OS X users through the Print Center. Because the Harlequin RIP behaves as any other printer on AppleTalk, you can send print jobs to the RIP running on a machine connected to the AppleTalk network, in the same way as any other printer. (The Harlequin RIP can emulate several, differently configured, printers if you wish.)

- Spool Folder

  This plugin allows you to set up the Harlequin RIP so that it continually scans or polls a folder (directory)—for example, on a central server—for input files. When these files appear and are complete, the RIP processes them. The spool folder uses the network file access provided by your machine—for example, Network File System (NFS) on machines running the UNIX operating system. You can use multiple configurations (as described in "Multiple inputs" on page 63), allowing you to have several scanned folders, each with a different associated page setup.

- Sockets

  With this plugin, the Harlequin RIP can accept input from a network socket client program, which may be part of a larger workflow system. This plugin supports TCP/IP and UNIX socket protocols.

1.3.11.3 Multiple inputs

For some input types, it is possible to have available several configurations or *page setups* (where parameters such as resolution, output device, rotation, and negation are given specific values). Using AppleTalk, several different *virtual* printers can be made available on the network using a single running copy of the Harlequin RIP, each printer with a different page setup. When using the

Spool folder plugin, several spool folders can be made available, each with an associated page setup.

You can enable multiple types of input allowing, for example, AppleTalk and Spool folder inputs to operate at the same time.

1.3.12 Complex jobs

Given enough memory and disk space, the Harlequin RIP can interpret arbitrarily complex jobs. The same is not true for many other high resolution RIPs.

This is achieved with a feature called *partial page buffering* (or "painting partial pages" in some messages). Essentially, if a particular job is so large that it cannot all be fitted into memory at once, the RIP interprets only as much of the page description as does fit into memory, and places the interpreted image in a partial page buffer. Having dealt with part of the image, the RIP gains enough free memory to deal with the next part—the effect being that the page description is divided into manageable sections, which are interpreted one at a time. Disk space is used to hold what has been interpreted so far until the whole image has been processed, and printing can commence.

1.3.13 Throughput control

In almost all circumstances, it is desirable to produce page images as quickly as possible while maintaining high quality. All Harlequin RIPs are written with this aim in mind and can benefit from operating with fast hardware. Beyond this, and especially when using high resolution imagesetters, special techniques can help maximize the rate of producing useful output. The Harlequin RIP can use these techniques, collectively called *throughput control*, when either of the multiple page buffering modes is selected. See Section 5.2 on page 20 for more details of multiple and single page buffering modes.

The Harlequin RIP increases job throughput in two ways.

Firstly, the RIP differs from other RIPs in the way bitmaps are produced and sent to an output device. A traditional RIP must interpret a page and send the bitmap directly to the output device before continuing with the next page. Because of this, if you have to change cassettes or some fault occurs with the output device, the current page cannot be output until the fault is cleared; productive work stops until the situation is resolved.

The Harlequin RIP can be operated in this way if desired, but it offers a powerful alternative that overcomes these limitations—by saving bitmaps on disk in the form of *page buffers*, before bitmaps go from the disk to the output device. Many page buffers can be stored on disk (as many as will fit into the available disk space), and the RIP can continue to produce and save page buffers, even if the device is not ready to output. If a printer jam occurs in an overnight job, the RIP is still able to process the job and the page buffers are ready for output the next day. In a high volume environment, this ability can be invaluable.

Even when there are no problems with the output device, you can still save time—if you need to produce more than one copy, you do not need to reinterpret the page description, because the bitmaps are still retained on disk. This means, for example, that if a page gets damaged in the developer or there is a problem with ink delivery then it is easy to print another copy.

Secondly, the Harlequin RIP increases job throughput by allowing job interpretation and output to occur simultaneously. While some pages of a job are being interpreted, other pages, which have already been interpreted, can be sent to the output device. This can greatly increase throughput when outputting several pages in succession. With a fast computer, it is possible to drive the imagesetter continuously for several pages. Even with fast output devices, time can be used effectively, because the RIP can be interpreting data while the output device starts up.

1.3.14 Previewing

The Harlequin RIP allows you to preview pages, at their output resolution on screen to check them for mistakes before they are output, at their full output resolution. You can preview halftone, contone and grayscale images using the full color capabilities of the display system.

You can request a reduced view of the entire page in a separate window. This provides a better idea of what the whole page looks like, and also acts as a navigation aid to help you to display any part of the page at full resolution, to check fine detail.

The remaining functionality depends on the page buffering mode. (Section 5.2 on page 20 describes page buffering modes.)

Using either of the multiple page buffer modes, you can view several separations or pages, overlaid or separately. This allows a good check of the page, including checking image positioning, trapping, and so on. You can view separations in their natural colors, thus obtaining a realistic impression of final output, or in false colors, to highlight differences between similar separations or composite pages.

In either of the single page buffer modes, you can view only individual separations or a composite image, and only in the natural colors.

1.3.15 Page buffer compression

When producing jobs at high resolutions or on large format devices, large amounts of disk space are often required if page buffers are used. The RIP makes the most of the available disk space by compressing page buffers as they are created and placed on disk, and then uncompressing them as they are read from disk and printed or displayed.

Compression saves a great deal of disk space and often means that large jobs can be printed without stopping the imagesetter, because compressed data can be read from disk more quickly. Stopping an imagesetter part way through a job can lead to a loss in output quality, so this facility can be of great benefit. (See the description of *data underrun* on page 40, which explains one problem that page buffer compression can help avoid.)

Page buffer compression always produces buffers of the same size as or smaller than the original. For color pages, it typically achieves a compression ratio of 3:1, and for newspaper pages a typical ratio of 10:1. That is, the compressed page buffer could be less than a third of the size of an uncompressed one for color pages, and a tenth of the size for newspaper pages. For color images, this can mean reducing disk requirements from 150 MB to only 50 MB.

Page buffer compression in the RIP is a completely lossless procedure. The quality of your output is fully preserved when compressing and then uncompressing the page buffers. For details of the amount of disk space you need to reserve for page buffers, see “Ability to RIP a job” on page 74.

From version 5.5 files greater than 2 GB can be read and written. The most likely use of this is the ability to generate page buffers greater than 2 GB. This requires MacOS 9 or newer.

1.3.16 Fonts and font handling

To print text, the relevant fonts must be installed in a RIP before interpreting a job, or the fonts must be supplied with that job.

If the interpreter sees that a Times-Roman font is needed for a particular job, it must *know* what a Times-Roman font is. The Harlequin RIP comes ready-supplied with the 35 standard fonts found on most PostScript-language printers and several additional fonts. (See page 356 for a description of the supplied fonts.) Thousands of other fonts are commercially available, as is software to help you design your own fonts from scratch. The RIP can load any PostScript font into the RIP for use in interpretation (unless the font is encrypted using some proprietary encryption mechanism).

The Harlequin RIP enables you to download, list, and proof fonts easily and quickly. You have complete control over which fonts are loaded when the RIP is run, and can remove any unwanted fonts at any time.

The Harlequin RIP can convert any Type 1 PostScript font into its own format, *DLD1*. DLD1 fonts consume much less memory and disk space than normal Type 1 descriptions, and so reduce processing time—but with no change in output quality.

The 35 standard hinted fonts are provided with the Harlequin RIP in DLD1 format. Font hinting is essential when previewing images or printing at low resolution, where it greatly improves the quality of the output.

1.3.16.1 Composite fonts

The Harlequin RIP supports composite fonts, in both Original Composite Format (OCF) and Character Identifier (CID) formats, which allow you to use large or complex fonts such as those for Chinese, Japanese, or Korean characters. Composite fonts support large character sets and are especially important in the Far East.

There are several features to allow easy composite font installation without requiring complex structuring of the fonts. Also, because of the high value of such complex fonts, the Harlequin RIP provides a way of encrypting fonts, so that they can only be used with a particular copy of the RIP.

1.3.17 Convenience features

The Harlequin RIP provides some useful facilities for monitoring media on cassette-loaded devices such as imagesetters and for using or testing fragments of PostScript code. These fragments, *page features*, can do such things as labelling output or performing basic imposition and media saving.

Most of these facilities require little or no knowledge of the PostScript language.

1.3.17.1 Media management

Output devices vary greatly in the type of output media they can use and the amount of manual intervention required. Some devices use a single source of roll-fed or sheet-fed material and the output is ready to use, while other devices can accept media from a variety of sources or require processing of the output. Equally, different users make very different demands on their imagesetters with respect to film and paper handling.

The Harlequin RIP includes a sophisticated media manager.

For example, you can keep track of the media left on the rolls of up to sixteen input cassettes; a variety of materials and media widths can be set, and the system allows you specify automatic media cutting at predetermined places, such as after a particular number of pages or before the take-up cassette gets too full.

In addition, the Harlequin RIP warns you when a cassette is nearly empty, and allows you to define how much space should be left between pages, between jobs, and between film cuts. It will even save media by automatically rotating pages to use the minimum amount of film.

New for version 5.5 is a Media Saving feature. For more information see Section 4.14 on page 162.

1.3.17.2 Page features

Sometimes you may want to apply a special effect to your jobs. For example, you may want to have the word *Draft* overprinted on every page. Because these can be one-off needs—you may want to produce a special copy of a document while it is at draft stage—it is preferable not to alter the job if at all possible.

The Harlequin RIP provides this facility by allowing you to specify a fragment of PostScript-language code, independent of your main job, to be processed in conjunction with it. A fragment such as this is known as a *page feature*.

A page feature carries out some process on your job, leaving the original untouched. Often, the effect of the process is to produce a desired printed effects but some page features produce no printed output because their purpose is to report some properties of the job.

A number of page features are provided with the Harlequin RIP for immediate use or as examples. You can choose any of those for immediate use from a menu in a dialog box. See Section 4.21 on page 191 for details.

As with plugins, you can add new page features by placing them in a particular folder.

1.3.17.3 Interactive sessions

The Harlequin RIP has a feature known as the *executive*, which allows you to run an interactive PostScript-language session. This means that you can type fragments of PostScript-language code and have them interpreted immediately. This can be very useful when debugging and testing small parts of jobs.

The executive feature is available in the Harlequin RIP on all supported platforms.

1.3.17.4 Page imposition

Page imposition is the process of laying out several pages of a document on one large sheet of paper or film. Using a combination of PostScript-language operators and an extension to the language, it is possible to take several pages and produce output on a large sheet of paper, each page being printed in an orientation and position determined by you.

Page imposition can be useful both for saving media—pages can be orientated so as to use the optimum amount of paper—and for printing pre-imposed sheets of paper, for instance when printing a book where certain pages are made out of the same piece of paper. Some understanding of the PostScript language is useful here, but the Harlequin RIP is supplied with several imposition templates which can be used immediately.

2

Running the Harlequin RIP

This chapter is a short guide to getting the Harlequin RIP running on your machine. It does not contain complete installation details because these differ between different combinations of computer, operating system, and output device. For full details, see the separate *Harlequin RIP Installation Guide* for your platform (combination of computer and operating system).

This chapter provides details for the following:

- Machine requirements, described in Section 2.1.
- Connecting your machine to an output device, described in Section 2.2 on page 77.
- The files and folders used by the RIP, described in Section 2.3 on page 78.
- Starting up the Harlequin RIP and an introduction to the standard menus and dialog boxes, described in Section 2.4 on page 83.
- Some menus that appear only when options are enabled, described in Section 2.5 on page 90.
- Stopping the Harlequin RIP, described in Section 2.6 on page 92.

2.1 Machine requirements

This section covers the hardware requirements that you need to run the Harlequin RIP. Do not worry if you are not familiar with the RIP technical terms used in this section. As you work through the manual, all of these terms will be explained. The “Glossary” on page 525 explains many of these terms.

Hint: Follow the basics of this section on first reading to get a working installation of the RIP. When you are more familiar with the RIP, use this section for reference, so that you can improve the RIP’s performance in your environment.

2.1.1 Performance

For a given processor type and speed, the most important things affecting the performance of the Harlequin RIP are the built-in or physical memory (RAM) and the speed and size of disks.

It is recommended that you use a 350 MHZ Power Macintosh or faster with 256 MB or more of built-in RAM for the RIP, with a floating point unit (FPU) and a minimum of 4 GB of free disk space.

Note: Please check the Install guide for the latest specification information.

In addition the following points should be considered:

- There must be sufficient space to hold page buffers on disk.
- There must be sufficient PostScript-language virtual memory available for the job. This is especially important when using composite fonts.
- For some output devices, a disk with a certain minimum performance may be required.

Important: The general rule is that the more memory, the better the performance. Note especially that if you use the following features, we recommend that you add extra RAM:

- Add an additional 8 MB RAM for each composite PostScript font used in a single job.
- Add an additional 12 MB RAM for when using Harlequin Precision Screening (HPS).

- Add an additional 256 MB RAM when using TrapPro or TrapProLite.
- Add an additional 32 MB RAM for EDS Screening in the output plugin.
- When using Harlequin ColorPro, add extra RAM. The required amount can vary according to the functions you use.
- There are some instances when the Harlequin RIP cannot paint partial page buffers to disk: for example, when recombining preseparated jobs or using TrapPro. In such cases, the RIP will need extra memory and *must* have enough memory to complete the job. See Section 6.10, "Harlequin RIP memory allocation", the *TrapPro User Manual* and *Harlequin RIP Installation Guide* for details.
- For large format devices, more memory may be required.

In general, if a job uses more than one of these features, add together the extra memory required by each feature. For example, if a job uses composite fonts and you are using HPS add together the extra amounts of RAM. You will also need enough extra RAM to accommodate any printer and network buffers you want to set up.

For more details, see Chapter 5, "Screening", Chapter 6, "Configuring the RIP", and Chapter 9, "Fonts".

Note: This manual uses conventions of font and style to describe special key combinations and to highlight the titles of programs, options in menus and dialog boxes, and text that we suggest you type. For details, see the "Conventions" on page 16 in the Preface.

The Harlequin RIP and most output devices perform acceptably with Macintosh virtual memory turned on. You may find problems with specific plugins; if this appears to be the case, try turning off **Virtual Memory**, in the Memory control panel.

In summary, as well as the memory and disk allocations discussed here, the performance of the RIP also depends on the following:

- The speed of the processor.
- The amount of additional RAM on your machine. (Additional RAM is RAM above the basic requirement.)
- The disk speed of your machine.

- The interface used to send data to the output device, especially if it is a high-performance device.

Performance issues are described throughout this manual, but see especially Chapter 6, "Configuring the RIP", and Appendix A, "Troubleshooting", for details about optimizing the performance of your hardware.

For further details on machine specifications you should consult the relevant installation guide.

2.1.2 Ability to RIP a job

Depending on what page buffer mode you choose, the Harlequin RIP will usually create one or more page buffers on disk when you process any job (see Chapter 5, "Harlequin RIP Output Methods", for full details). This allows the RIP to print any job on a machine of any performance, no matter how complex the job is. The only requirement for your machine (apart from a minimum requirement of RAM) is that it must have sufficient free disk space to hold these page buffers.

By default, the Harlequin RIP compresses page buffers as it creates them: the compression is always lossless and does not affect the output quality in any way. This compression can reduce the disk space required to anything from half to a tenth of the uncompressed file, or even less. However, you do not have to compress page buffers if you do not wish to. See Chapter 6, "Configuring the RIP", for full details.

Note: Crop marks can greatly increase the actual size of the page (by adding largely blank surrounds to the image) and hence create a need for more disk space. If you ask the Harlequin RIP to compress page buffers as they are created, the extra space required by crop marks compresses well, as does the other blank space between text and images.

Typical free disk requirements, for both compressed (C) and uncompressed (U) page buffers, are shown in the following table, giving details for output at different resolutions and for different page sizes. These figures are for halftone page buffers holding a monochrome page or one separation of a separated page. All figures are given in MB.

Contone page buffers or composite color page buffers are bigger than monochrome page buffers when uncompressed, by a combined factor taking

	US Letter		A4		Tabloid		A3		Broadsheet	
Resolution	U	C	U	C	U	C	U	C	U	C
300 dpi	1.00	0.20	1.00	0.20	2.00	0.40	2.10	0.41	4.60	0.93
400 dpi	1.70	0.36	1.80	0.37	3.60	0.71	3.70	0.74	8.20	1.60
600 dpi	4.00	0.80	4.10	0.83	8.00	1.60	8.30	1.70	19.00	3.70
800 dpi	7.10	1.40	7.40	1.50	14.00	2.90	15.00	3.00	33.00	6.60
900 dpi	9.00	1.80	9.30	1.90	18.00	3.60	19.00	3.70	42.00	8.30
1200 dpi	16.00	3.20	17.00	3.40	32.00	6.40	34.00	7.20	74.00	14.80
1524 dpi	26.00	5.20	27.00	5.40	52.00	10.40	54.00	10.80	120.00	24.00
2400 dpi	64.00	12.80	68.00	13.60	128.00	25.60	136.00	27.20	296.00	59.20
3048 dpi	104.00	20.80	108.00	21.60	208.00	41.60	216.00	43.20	480.00	96.00

Table 2.1 Typical free disk requirements for page buffers

account of the number of bits used per color and the number of colors in the page buffer. For example, when uncompressed, a four-color page using 8 bits per color (256 tonal values) would use 32 times more memory than the figures given here. It is harder to predict the relative sizes of compressed page buffers because the contents of the page have a large effect. For example, the compression ratio achievable for a page filled with an unchanging background tint is likely to be better for a contone page buffer than for a halftone page buffer.

In addition, you must ensure you have enough disk space to hold workspace for processing the scanned images on any one page of your job. For example, when printing the Seybold *Musicians* test job (a full-color scanned image), 8 MB of extra disk workspace will sometimes be required in addition to the figures shown above. (Whenever possible, the Harlequin RIP uses RAM in preference to disk space.)

If you have spare memory after allocating memory for the considerations described in “Performance” on page 72 and in the separate *Harlequin RIP Installation Guide*, you may be able to use this surplus to create a RAM disk in which to place page buffers. To be useful, the RAM disk must be at least large enough to hold a single page buffer, and if you want to use throughput (using either of the multiple page buffer modes), it should ideally be large enough to hold at least two page buffers.

For 2540 dpi color work, a RAM disk of around 100 MB is desirable. For 1016 dpi monochrome output, a RAM disk of around 30 MB may be enough.

2.1.3 Driving a printer effectively

The machine requirements discussed so far have concerned the production of a page buffer. Meeting these requirements is sufficient for you to view the page buffer on screen or for the Harlequin RIP to convert it into a file in a useful graphics format.

When you want to convert the page buffer to an image on physical media, you must transfer the data to an output device. This transfer is another factor determining overall performance and often imposes other requirements on the computer system running the RIP.

Many output devices need data to reach them at a sustained high speed; in general, this speed becomes higher and harder to achieve as the resolution of the device increases. Table 2.2, page 76, shows examples of required data transfer rates (in kilobytes per second) for typical output devices supported by the various versions of the Harlequin RIP.

Rate (KB/s)	Resolution (dpi)	Output device
200	300	Large format inkjet printer
2000	300	Dye-sublimation printer
750	2400	Slow imagesetter
1500	1270	Fast imagesetter
8000	4000	Large format drum recorder

Table 2.2 Required data rates for typical output devices

With simple jobs, these data rates can be achieved without using a page buffer on disk. However, with complex jobs, a page buffer may be required, which means that the disk on your computer must be fast enough to supply data at these rates. If the disk is too slow and your printer is not capable of stop / starting without abandoning the page, it is not possible to output the whole page. If your printer can stop / start in the middle of a page, then achieving

the required data rate is less important, but the quality of the output may still be affected, depending on the device.

When you look at the data rates in this table, note the following:

- The disk speed of your machine must be slightly faster than the data rate of the output device in order to drive it successfully—the extra speed allows for the overhead of transferring the output to the printer. For example, a machine with a disk speed of 1.3 MB/s may be required to drive a slow imagesetter at 750 KB/s.
- To smooth out peaks and troughs of disk performance and other system and RIP functions, the Harlequin RIP uses a printer buffer in memory. Typically, you should make this buffer large enough to hold between 5 and 10 seconds of output to the device: for example, 7.5 MB for a device that outputs at 750 KB/second. You can set the size of the printer buffer in the Configure RIP dialog box: see Chapter 6, "Configuring the RIP".

We strongly recommend that you use compressed page buffers. If this is done, the Harlequin RIP can achieve higher data rates because less data has to be read from disk. Compressing page buffers also lets you run the RIP on a slower disk than would be required were page buffers not compressed. There are very few situations where it is not desirable to compress page buffers.

2.2 Installing printer interface cards

If you want to produce output on a printer or imagesetter, there must be a suitable way of connecting the output device to the computer running the Harlequin RIP. Many low or medium resolution devices can connect to standard communications ports or printer ports on your computer. Using a high resolution or high speed output device may mean that you must install a special printer interface card in the computer.

There should be installation instructions supplied with any interface card and there are some general guidelines in the separate *Harlequin RIP Installation Guide* for each platform.

2.3 Harlequin RIP folder structure

The folder in which the Harlequin RIP is installed contains the Harlequin RIP application itself, and a folder called `SW`, as well as other support files. The `SW` folder contains the files that the RIP needs in order to run, such as device driver files, PostScript-language header files, and fonts. You can install new device drivers, features, and so on—in many cases by placing the relevant folders or files directly into the appropriate folder, but it is safer to use a supplied installation program if there is one.

Warning: Do not delete any files from the `SW` folder, except in the limited cases where this manual or the Harlequin RIP support staff advise you to do so.

Note: Installing the Harlequin RIP creates some of the following items immediately: other items are created later, as required by later reconfiguration of the RIP or the use of particular options such as screening features or spooled input.

The `SW` folder contains the following items:

- The `caldata` folder, which is created when you first use the **Output > Print Calibration** menu option to print a calibration target, and is updated as you print more targets. This folder holds files and folders describing the printed targets. If you use the Genlin program to measure a printed target, it generates a file of results in this folder.
- The `categories` folder contains the categories resource.
- The `charstrings` folder contains the file `StandardCharStrings`, which contains the standard name-to-character mappings used by most fonts. Other mapping files may also be stored here.
- The `CIDFont` folder contains fonts defined in the CID (character identifier) format.
- The `CMap` folder contains information for use with CID fonts.
- The `colorrenderings` folder contains color rendering resources.
- The `colorspaces` folder contains resources for the color spaces defined in the Harlequin RIP.
- The `Complete` folder is provided as a default location for the spool folder input to place files that it has successfully processed.

- The `Config` folder contains all the configuration files for the Harlequin RIP. These include files detailing such things as the current page setup and Configure RIP settings, as well as folders for information including the configuration for available devices, default color profiles, and target definitions.

  In the `Config` folder, the `Factory Settings` subfolder contains the default configuration for the Harlequin RIP when it is shipped. This is essentially a copy of the `Config` folder itself.

  In the `Config` folder, the `Page Setups` subfolder contains all the page setups you have saved within the Harlequin RIP.

- The `Crdgen` folder contains the color rendering dictionary (CRD) generator plugin executables. You can only manipulate CRDs in the Harlequin RIP with the ColorPro option enabled.

- The `Devices` folder contains all the output plugin files (possibly within subfolders) for the various output devices.

- The `encodings` folder contains the font encodings for the fonts installed in the RIP.

- The `Error` folder is provided as a default location for the spool folder input to place files that it cannot process.

- The `Extensions` folder can contain folders or files used to implement extensions to the RIP.

- The `FlatPgbDir` folder provides space for the page buffer files used by FlatOut. See the *FlatOut User Guide* for details.

- The `fonts` folder contains fonts used by the Harlequin RIP (including the fonts installed with the RIP).

- The `FontSet` folder is used for PostScript LanguageLevel 3 font sets, often used with CFF fonts. It may be empty.

- The `forms` folder contains resources for bitmap forms.

- The `halftones` folder contains halftone resources.

  Note: The comments in these halftone resources files show how you can define custom dot shapes in capable graphics and layout applications, and have these dot shapes linked to Harlequin screens in the generated PostScript-language files.

- The `icccrd` folder contains the color rendering dictionaries (CRDs) produced from ICC profiles.

- The `IdiomSet` folder contains idiom set resources. Each idiom set in this folder is loaded when the RIP starts.

- The `Inputs` folder contains all input plugin files (AppleTalk, Spool, and any others).

- The `Messages` folder has been moved to the same level as the SW folder and contains localized message files. The appropriate file is selected the first time the RIP is started

- The `MediaSavingDir` contains page buffers that are marked for media saving.From Eclipse Release SP1 the `MediaSavingDir` is located as a subfolder to the `PageBuffers` folder.

- The `NamedColor` folder is the location of files defining a resource type `/NamedColor`, which stores color values referred to by name. It is accessed by the Install ICC Profile dialog box present when using ColorPro, as well as by the Harlequin core RIP.

- The `NamedColorOrder` folder contains files defining the orders in which resources of type `/NamedColor`, are searched when the Harlequin RIP is looking for the definition of a named color.

- The `Page Features` folder contains all the PostScript-language header files that are available in the **Enable Feature** pop-up menu of the Edit Page Setup dialog box. This menu is generated dynamically from the files available in this folder. If a feature is turned on in the relevant page setup, the appropriate file is run at the beginning of the job. Additional example page features are available in the folder called `Examples` within this folder. The example files supplied with the RIP show you

how to do such things as produce draft copies, perform page imposition, resubmit page buffers, and use image replacement with DCS files. You can add your own files if you wish.

- The `PageBuffers` folder provides space for rendered pages that are written to disk. From Eclipse Release SP1 the `MediaSavingDir` is located as a subfolder to the `PageBuffers` folder.
- The `Passwords` folder may be empty but is available for files used to install passwords for optional parts of the Harlequin RIP. The RIP installs all new passwords automatically, as it starts. Files with extension `.pwd` are files to be used by the RIP, files with numeric extensions (`.001`, `.002`, and so on) have been installed, and files with extension `.pwx` are files that the Harlequin RIP has failed to install.
- The `patterns` folder contains resources for PostScript-language patterns.
- The `PrepFiles` folder contains all the prep files used by the Harlequin RIP.
- The `procsets` folder contains various patches to the PostScript language, as well as other functionality that is not built directly into the Harlequin RIP. Patches for specific applications are held here, as well as calibration test jobs.
- The `ReproductionCriteria` folder is the location of files defining a resource type `/ReproductionCriteria`. This is used to link color rendering dictionaries (CRDs) to the criteria which created them. This allows the Harlequin RIP to test whether a CRD needs to be regenerated or whether one already exists.
- The `Screenin` folder contains screening plugins for use by the Harlequin RIP. In many installations, there are no screening plugins.
- The `Screens` folder is used when halftone screens are cached (saved to disk for later use). There is a subfolder here for each dot shape cache known to the Harlequin RIP, either as supplied or as created during use.
- The `Separation Features` folder performs a similar task to `Page Features` but applies only when separating jobs in the Harlequin RIP.

- The `Spool` folder is a default location used by the Spool folder input plugin for receiving jobs.
- The `Sys` folder includes `HqnStart`, the Harlequin-specific startup file, and `Bootlist`, a list of files to be executed upon booting (starting) the Harlequin RIP. This folder also contains `HqnProduct`, which contains PostScript-language startup code specific to that product, and `HqnOEM`, which may contain additional startup PostScript-language startup code created by the RIP supplier.
- The `targeteps` folder contains any EPS files that are incorporated in custom calibration targets (and potentially other targets). This folder is referred to from target definitions while interpreting a target file, especially in response to the Print Calibration dialog box.
- The `tmp` folder is used as a location for temporary files.
- The `TrapParams` folder is used for PostScript LanguageLevel 3 trapping parameters. It may be empty.
- The `Usr` folder contains several files needed by the Harlequin RIP.
- The `Utilities` folder contains files, each of which can perform a useful function when run as a job (using the **Print File** menu option):
  - `BackupConfiguration.ps`
    This file enables you to make a backup file containing all your configuration settings for an installation of the Harlequin RIP.
  - `BackupFonts.ps`
    This file enables you to make a backup file containing all your fonts, both the standard set and any additional fonts that you have installed.

  You can store such a backup file elsewhere for security and, for example, use it as a simple way to restore a complex configuration if you need to reinstall the same version of the Harlequin RIP. (You can restore backed-up fonts to a newer version of the RIP but you can only restore configuration settings to the same version of the RIP.)
- The `WorkSpace` folder provides space for any temporary workspace files created by the RIP.

- The `LOGFILE` file contains a record of all transactions with the Harlequin RIP monitor. This file can be saved and its size restricted. For more information see Section 3.4, “Monitoring the Harlequin RIP”.
- The files `FILERED.PS` and `FILEMAP.DAT` (replacing `FILEMAP.PS`, which is still present for short-term compatibility) contain important information for use in file name mapping. The RIP manages these files automatically: you must not change these files manually.

  File name mapping is necessary because PostScript-language file names can be very long, can contain characters that have special meanings for file systems on the computer running the Harlequin RIP, and are case sensitive. For each PostScript-language file name that could be a problem, the RIP creates a unique and acceptable file name in the file system and records both file names together as a mapping in `FILEMAP.DAT`.

  You may find it useful to inspect `FILEMAP.DAT`, if you need to associate a particular file name with the other name in its mapping. For example, this is a typical mapping (between Press and PRESS):

  ```
  (Press)(PRESS)M
  ```

- The `version` file contains text describing the version of the Harlequin RIP, for use by some RIP utilities. Do not edit or remove it.

2.4 Starting up the Harlequin RIP

You should refer to the installation guide for your platform for details on how to install and configure the Harlequin RIP.

Note: Prior to the Eclipse Release all RIPs were supplied as a single executable. From the Eclipse Release the RIP executables are supplied with associated shared library files. A consequence of this is that the RIP executable is now significantly smaller in size. The associated shared library files must be in the same folder as the RIP executable otherwise the RIP will not start.

To start up the Harlequin RIP application, double-click the Harlequin RIP icon at the top level of the installation folder.

An initial dialog box is always displayed while the program starts up. Some extra things happen in special circumstances:

- When you are starting up the RIP for the first time after installation, you see a dialog box asking you to choose the language to be used in dialog boxes, menus, and messages. The dialog box shows you which languages are available. (A language is available if the entries after its name are all `Present` or `Yes`.) If you are in doubt, choose `English (United States)` initially; you can switch to another language later, using the **Harlequin RIP > Language** menu option, as described in Section 6.14 on page 269. Select your chosen language and click **OK**.
- When you have installed a plugin or other option, that option may require enabling with a password. The RIP can read the password from a file if the installation process for the plugin supplied one. If the RIP reads a password file, it displays a dialog box with a message similar to this but with differences to the *italic* text.

  `Imported password file Passwords/`*`1234-56-variable-string`***`.pwd`**

  Click **OK** to dismiss this dialog box.
- If you have chosen to reset the Harlequin RIP to its factory settings, you see a series of dialog boxes asking you which settings you wish to reset. See Section 6.13 on page 268 for details of how to do this.

When the RIP has finished loading the desktop (Finder) menus are replaced by those shown in Figure 2.1:

Figure 2.1 The Harlequin RIP menus

Some windows appear, as described in Chapter 3, “Getting Started with the Harlequin RIP”. That chapter describes some basic procedures that you can use to familiarize yourself with the Harlequin RIP. The remainder of this chapter introduces the menus, tool bar, and status bar; and describes how to stop the RIP.

2.4.1 The menus

There are several menus:

- The **Harlequin RIP** menu contains commands for configuring and operating the RIP, as well as for producing output. There is also a command to exit the Harlequin RIP, whose use is described in "Stopping the Harlequin RIP" on page 92.
- The **Edit** menu contains the common window-based edit facilities of **Cut**, **Copy**, **Paste**, and **Clear**.
- The next menu changes name to indicate which device it is controlling. This menu contains commands for controlling output and cutting the media being used on any printers connected to the computer. Because the displayed name can change, this documentation refers to it as the **Device** menu. (Figure 2.1, page 84, shows Preview in this position.)

  The device does not necessarily have to be a physical output device connected to your machine. The RIP is equally capable of saving an image to a file in a particular format, such as TIFF. You can find out more about these options in "Selecting different devices" on page 122.
- The **Color** menu contains commands for starting the Separations Manager and for color management. The color management commands depend on optional parts of the Harlequin RIP. See Section 2.5.1.
- The **Output** menu contains commands for controlling calibration, media management, and output.
- The **Fonts** menu contains commands for installing, deleting, and proofing fonts within the RIP.
- When required, the RIP can display other menus to the right of the permanent menus mentioned so far. For example, the **Print File** menu appears when you have used the **Print File** command to print a file, and contains commands allowing you to control printing of that file.

All standard commands in these menus are described in later chapters of this book together with the situations and operations that require you to use them. See Section 2.5 on page 90 for details of menus affected by optional features in the Harlequin RIP.

2.4.2 The tool bar

All versions of the Harlequin RIP have a tool bar containing icon buttons and a status area. The buttons provide rapid access to frequently used menu options and dialog boxes, as described in Section 2.4.2.1 on page 87. The status area shows what the RIP is doing, as described in Section 2.4.2.2 on page 89.

The tool bar is a free-floating window, which you can display or hide using the **Harlequin RIP > Tool Bar** menu option.

2.4.2.1 Tool bar buttons

These tool bar buttons have the following uses:

Print File

Displays the Print File dialog box, where you can choose a file to print. This is equivalent to the **Harlequin RIP > Print File** command.

Print Calibration

Displays the Print Calibration dialog box, where you can print various patterns of calibration target for use in calibrating output devices, including printing presses. This is equivalent to the **Output > Print Calibration** command.

Start Inputs

Starts any enabled inputs. This is equivalent to the **Harlequin RIP > Start Inputs** command when the inputs are stopped.

Stop Inputs

Stops any enabled inputs. This is equivalent to the **Harlequin RIP > Start Inputs** command when the inputs are enabled.

Page Setup Manager

Displays the Page Setup Manager dialog box, where you can create and edit page setups. This is equivalent to the **Harlequin RIP > Page Setup Manager** command.

Device Manager

Displays the Device Manager dialog box, where you can instantiate (create) and configure devices driven from a multiple device driver. This is equivalent to the **Harlequin RIP > Device Manager** command.

Separations Manager

Displays the Separations Manager dialog box, where you can create and edit separation styles for the selected device. This is equivalent to the **Color > Separations Manager** command.

Color Setup Manager

Displays the Color Setup Manager dialog box, which allows you to create and edit color setups with or without color management depending on whether the password-enabled ColorPro option is activated. See the *Section 11.8 on page 450* and *Harlequin ColorPro User Guide* for details. This is equivalent to the **Color > Color Setup Manager** command.

Calibration Manager

Displays the Calibration (Dot Gain) Manager dialog box, where you can create and edit calibration sets. This is equivalent to the **Output > Calibration Manager** command.

Cassette Manager

Displays the Cassette Manager dialog box, where you can create cassettes and edit their information. This is equivalent to the **Output > Cassette Manager** command.

Input Controller

Displays the Input Controller dialog box. Also, this button hides the controller if it is already displayed. This is equivalent to the **Harlequin RIP > Input Controller** command.

Media Manager

Displays the Media Manager dialog box, where you can set up automatic media management. This is equivalent to the **Output > Media Manager** command.

Note: The **Device Manager**, **Separations Manager**, **Color Setup Manager**, **Calibration Manager**, and **Cassette Manager** buttons are also available from the Edit Page Setup dialog box.

2.4.2.2 Status area

The status area has three sub-areas: one shows what the input system and interpreter are doing, one shows what the output system is doing, and a final one shows the most recently used output device.

Figure 2.2 shows some typical contents of the status area.

Figure 2.2 The status area of the tool bar

The meanings of these example status bars are:

1 Idle	The RIP is not looking for jobs on its inputs.
2 Scanning	The RIP is looking for input but none is arriving.
3 Interpreting	The RIP is interpreting a job.
4 Printing	The RIP is sending a job to an output device.

In all these examples, the output device is the Preview device. The text can change to show other types of output, including output to graphics files and real printers and imagesetters.

This completes a brief description of the controls and status indicators in the Harlequin RIP. If you want to try using the RIP, see Chapter 3, "Getting Started with the Harlequin RIP" on page 95. If you want to stop the RIP, see "Stopping the Harlequin RIP" on page 92.

2.5 Menus affected by optional features

A number of commands and options in dialog boxes appear only if your copy of the Harlequin RIP has been supplied with certain optional features and these are enabled.

The major features that have this effect are:

- Harlequin ColorPro. See Section 2.5.1.
- Harlequin Screening Library (HSL). The visible changes are limited to new dot shapes in the screening part of the Edit Style dialog box, as described in Chapter 5, "Screening".
- TrapPro and TrapProLite. See Section 2.5.2.
- Media Saving. See Section 4.14.

2.5.1 ColorPro™ menus

ColorPro is a color management system that can work as an integrated part of the Harlequin RIP. If relevant options within ColorPro are present and enabled, the following commands appear. See the separate manual entitled *Harlequin ColorPro User Guide* for full details.

In the **Color** menu:

Color Rendering Intent Manager

This command allows you to create and edit custom color reproduction strategies in ColorPro. It appears only when the ColorPro option is enabled.

Color Setup Manager

A standard set of options is available with the Color Setup Manager without ColorPro including Black generation and UCR control and color management override options. When ColorPro is activated an extended set of options is available. You can create and edit color setups including the selection of input and output profiles, rendering intents and press emulation.

Install ICC Profile

This command supports the use of industry-standard color profile files which enable portable definitions of the characteristics of printers, printing processes, presses, scanners, and other equipment. It appears when Harlequin ColorPro is enabled.

Uninstall ICC Profile

This command uninstalls ICC profiles and appears when Harlequin ColorPro is enabled.

2.5.2 TrapPro™ and TrapProLite™

TrapPro is an option for the Harlequin RIP that can be set up to perform trapping. If TrapPro is present and enabled, the following command appears in the **Output** menu. See the separate *TrapPro User Manual* for full details.

TrapPro Manager

This command displays a dialog box where you can inspect and create different sets of rules for trapping. These rules become available in the Trapping section of the Page Setup dialog box. See Section 11.10, “Trapping features” for details.

Ink Set Manager

This command displays a dialog box where you can configure various types of ink including normal, opaque and transparent.

2.5.3 Media Saving

Media Saving is a layered option for the Harlequin RIP which is enabled using a password. If Media Saving is present and enabled, the Media Saving option appears in the **Output** menu.

Media Saving

This option displays a dialog box where you can view the various flats being created and view, roam or delete the various pages used to make up the flats. See Section 4.14, “Media saving option” for details.

2.6 Stopping the Harlequin RIP

You can stop the RIP whenever you wish but you should keep it running as much as possible whenever you expect jobs to be input. There are very few cases where you *must* stop the RIP: for example, you must stop the RIP when you shut down the computer running the RIP or when you update your copy of the RIP.

The state of the RIP when you stop it is also the state that the RIP assumes when you next start it. For example, if you quit the RIP when inputs are active then the RIP restarts with the same inputs enabled.

2.6.1 Quitting the Harlequin RIP

If you are the only user of the RIP, all you must do is ensure that no jobs are in progress and choose the **Quit** command in the **Harlequin RIP** menu. Take more care if there are other users, as described here.

If the RIP is providing a network service, warn the other users that there will be an interruption of service.

Disable output, by selecting the check box labeled **Disable output** in the Output Controller, if you are operating in either of the multiple modes. This shuts down the output cleanly, by allowing the current job to complete but not starting any other jobs. (When you restart the RIP, output is re-enabled automatically, though you will have to answer a question if there are any jobs waiting to be output in the Active Queue.)

Wait for any active jobs to complete.

Leave the RIP settings in their usual state, unless you know that you will be making significant changes to the RIP, the computer, the network, or connected output devices.

- If you leave settings unchanged, you need only restart the RIP to have it start responding to all its previous inputs.
- If you are making changes, you may prefer to disable inputs from other computers until you have restarted the RIP and proved that there are no resultant problems.

From the **Harlequin RIP** menu, choose **Quit** (or press Command-Q) to exit the RIP.

2.6.2 Stopping the computer

If you are also stopping the computer, exit any other applications and follow the usual procedure described in the manual for your computer or operating system.

3

Getting Started with the Harlequin RIP

Chapter gave a broad overview of the kinds of tasks the Harlequin RIP can perform. In this chapter you will learn how to process simple jobs, and how to switch between different configurations.

3.1 A simple Harlequin RIP session

Once the Harlequin RIP is installed and running on your machine, you can start to use it. “Starting up the Harlequin RIP” on page 83 describes how to start the RIP and gives an overview of the menus and tool bar.

It is a good idea to start with a short test job and to view it on screen so that you avoid wasting materials. (Even when you are familiar with the RIP you should consider using such an on-screen test when processing a new kind of job for the first time.)

Note: This manual uses some conventions of font and style to describe special key combinations and to highlight the titles of programs and dialog boxes, options in menus and dialog boxes, and text that we suggest you type. For details, see “Conventions” on page 16 in the Preface.

3.1.1 Creating a page setup

First, you need to create a convenient *page setup*—a collection of settings that the RIP uses to process the jobs submitted to it:

1. Choose the **Page Setup Manager** option from the **Harlequin RIP** menu. If you cannot choose this option, stop inputs to the RIP. To do this, click the tool bar button that shows a red arrow and traffic light, or choose the **Harlequin RIP > Start Inputs** menu option.

2. In the Page Setup Manager, as shown in Figure 3.1, select a page setup. `Default Page Setup` is a safe choice: select it and click **Edit** to display the Edit Page Setup dialog box. If you want to create a new page setup, the easiest way is to copy the `Default Page Setup`. Select `Default Page Setup` and click **Copy** to display the New Page Setup dialog box.

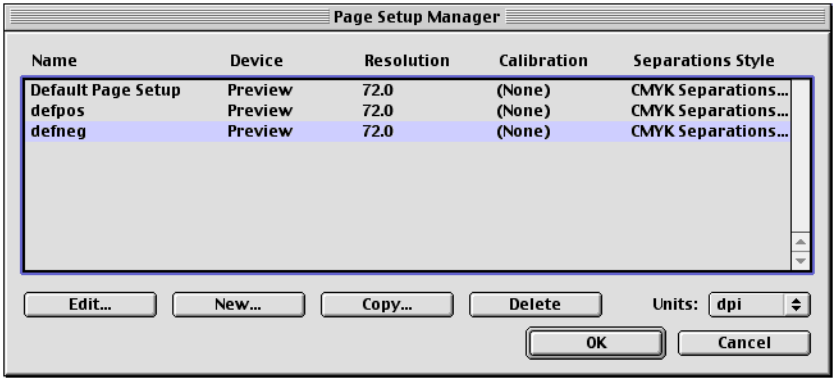


Figure 3.1 Page Setup Manager dialog box

3. In the Edit Page Setup dialog box, shown in Figure 3.2, set the **Device** to None and the **Vertical** and **Horizontal** resolutions to something small, say 72 dpi. If you change the **Device**, you must choose a separations style listed in the **Style** pop-up menu and, for some devices, a cassette name from the **Cassette** pop-up menu.

   For the purposes of this example, you can select any option from these lists. For more information about the options in this dialog box, see Section 4.3, “Edit Page Setup dialog box” on page 119.

   The None device does not produce any printed output, but does perform all the necessary processing for the job, including producing *page buffers*—as defined on page 535 in the “Glossary”. This device can be used for testing and timing jobs, and is especially useful for previewing the job on screen.

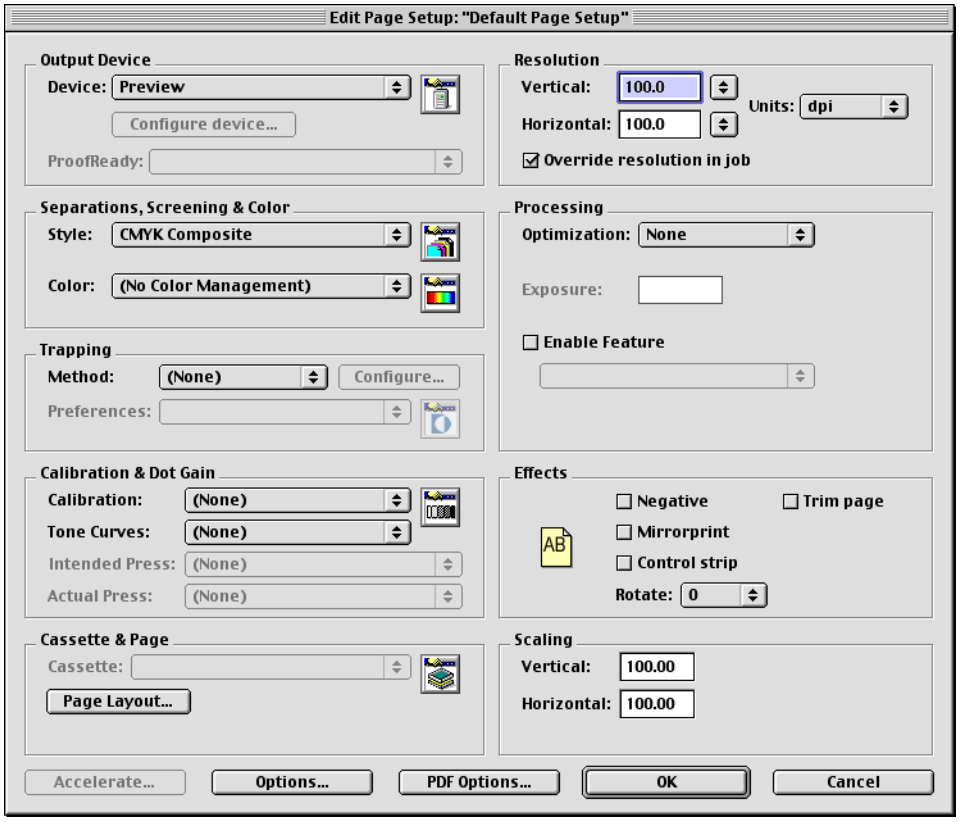


Figure 3.2 Edit Page Setup dialog box

4. Click **OK**. (Click **Save As** if you are working in the New Page Setup dialog box, and save the page setup as `Default Page Setup`; this changes the original page setup but it is convenient for use this name during this session.)

5. Click **OK** again to close the Page Setup Manager dialog box.

The Output Controller / Monitor window must be displayed for you to see the processed output for the `None` device. If you cannot see this window: first choose the **Configure RIP** option from the **Harlequin RIP** menu and check that the option shown against **Page buffering** is `Multiple (Parallel)`; then dis-

play the **Output** menu and look at (but do not choose) the option **Output Controller**.

If there is a check mark next to the menu option, the RIP is displaying the window but it may be hidden behind another window. The **Output > Output Controller** menu option can be used to toggle between opening and closing the Output Controller / Monitor. Each time that you open the Output Controller / Monitor it opens in front of all other RIP windows.

Note: The Output Controller is only available in either of the multiple page buffer modes. You can also view a page in one of the single modes by setting the output device to `Preview` instead of `None`. In the following description we assume that you are working in `Multiple (Parallel)` mode. If you are using one of the single modes, see "Sending output to the screen" on page 126 for more details about previewing pages.

For the example job described next, make sure that you have deselected the **Disable output** check box in the Output Controller / Monitor. This box is selected by default, so that you can hold pages for on-screen viewing before sending the pages to real output devices.

3.1.2 Creating a simple job

You also need to set up a sample job. Usually, jobs are files created by another application, but you can create a simple job within the RIP, as follows:

1. From the **Fonts** menu, choose **Proof Fonts**. A window appears with a list of the available fonts, which the Harlequin RIP can use with any of its possible output devices. (See Figure 3.3.)

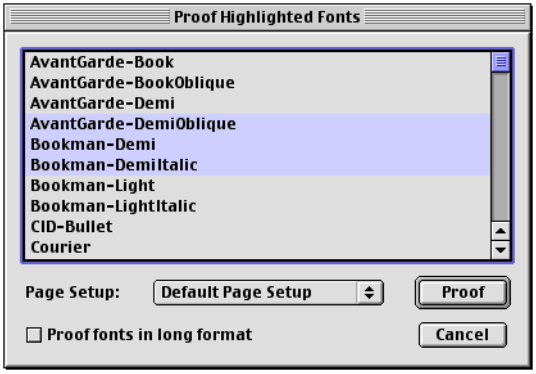


Figure 3.3 Proof Highlighted Fonts dialog box

2. Select between one and six fonts. To select a range of fonts, click on the first font of that range and then hold down the **Shift** key when you click to select the last font.
3. From the **Page Setup** pop-up menu, select `Default Page Setup`.
4. Click the **Proof** button. Several things happen on screen, with some items appearing and quickly disappearing again:
   - A **Print File** menu appears alongside the other RIP menu titles. This menu disappears when the job is complete.
   - The status area on the right of the tool bar in the Harlequin RIP window shows an animated picture of a hand writing a page. “None” appears in the status area on the right. (When you use other output devices, you see other animations and names.)**Note:** If you cannot see the tool bar, use the **Harlequin RIP > Tool Bar** menu option to display it. If you cannot see the RIP Monitor, use the **Harlequin RIP > RIP Monitor** menu option.
   - Text reporting the progress of the job appears in the scrolling text area of the RIP Monitor window as the RIP starts the job and reads the necessary fonts.
   - At least one progress dial window also appears and shows what is happening. For example, the Read Dial shows how much of the job the RIP has read and disappears when the RIP has processed the

complete job. With a small job like this proof and a fast computer, the Read Dial may not appear; Figure 3.4 shows the dial. Other dials can appear, depending on the size of the job and the settings in your copy of the RIP.

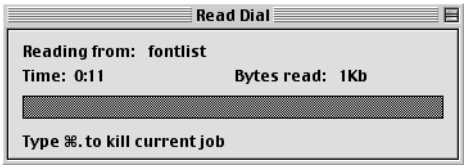


Figure 3.4 Read Dial

Notice what happens in the Output Controller / Monitor window. A job called `1. fontlist` appears in the list on the left, the **Active Queue**. After a few moments its name moves into the box at upper center of the window, to show that the RIP is processing it, and then to the **Held Queue** on the right. (The job is called `1. fontlist`, to show that it is the first page of the fontlist job. This job is probably only one page long, unless you chose several fonts.)

3.1.3 Previewing the image on screen

This job has now been processed by the Harlequin RIP and sent to an output device. The output device you chose was `None`, a dummy device provided for test runs like this one and for previewing, so no physical printing has happened. However, you can look at an on-screen view of the page you have created:

1. Select the job in the **Held Queue** (by clicking), and then click the **Roam** button. A Roam window appears. Note that you can preview any page in the Output Controller.

The Roam window displays samples of the fonts you selected. (See Figure 3.5.) This window also displays the title of the page, `1.fontlist`, the color of the page, and the resolution. The **Roam** menu appears to the right of the **Fonts** menu.

For most sizes of page, there are also horizontal and vertical scroll bars at the edges of the Roam window. (The scroll bars appear only when the window is too small to display the whole page at one time.) When there are scroll bars,

you can use them to move your view to different parts of the page image. Alternatively, you can drag the page image around by holding down the left mouse button when the cursor is over the image and moving the mouse. While you are dragging the image, the shape of the mouse cursor changes to a gripping hand. For more information about navigating in the Roam window, see Section 4.5.3 on page 128.

Figure 3.5 Roam window

Note: When viewing a higher resolution image, the **Roam > Reduced Roam** menu option is probably available. It allows you to see more of the image in one view.

When you have finished inspecting the page preview, close the window. To do this, click the close box or choose the **Close** option from the **Roam** menu. Alternatively, you can use the standard methods for your operating system.

Note: You must close the Roam window (and the Reduced Roam window if you opened it) before you can roam another page.

3.1.3.1 Other pages in the job

If there are other pages in the job, the RIP has probably processed them in the time you spent inspecting the first page: if so, there are appropriate messages in the RIP Monitor window and new entries in the **Held Queue** on the right of the Output Controller / Monitor. Any following pages are called `2. fontlist`, `3. fontlist`, and so on. You can:

- View one of the processed pages by selecting it and clicking the **Roam** button.
- Stop processing any remaining pages by using the **Kill Current Job** option in the **Print File** menu. Any pages already processed stay in the **Held Queue** until deleted.

3.1.3.2 Killing jobs and error messages

After killing a job and depending on what stage the job had reached, you may see a PostScript-language error message in the RIP Monitorwindow. Error messages look similar to the following:

```
%%[Error: interrupt; OffendingCommand: interrupt; File: %disk0%tmp/fontlist]%%
Job Not Completed: fontlist
```

Such error messages are harmless if you stopped the job: they simply report that the job stopped before it was complete.

In other circumstances, an error message alerts you to a possible problem with a job. The details of the message may help a PostScript-language programmer or your support organization to diagnose the cause of that problem.

3.1.4 Outputting to a real device

Your installation of the Harlequin RIP has probably been set up to be able to talk to a real printer or imagesetter and, if this is so, you can try sending some output to it. (If you do not have a suitable physical output device, try using `None` again but vary the screen resolution to a value in the range 300 through 600 dpi, so that you can see more detail. Run another job proofing fonts, then move to the next section, “Sending a job to the Harlequin RIP” on page 106.)

To send output to a physical device:

1. First display the **Harlequin RIP** menu and choose the **Page Setup Manager** option (which this manual often describes as choosing the **Harlequin RIP > Page Setup Manager** option).
2. In the Page Setup Manager dialog box, select `Default Page Setup` and click **Copy** to display the New Page Setup dialog box. The New Page Setup dialog box is very similar to the Edit Page Setup dialog box, shown in Figure 3.2 on page 98.
3. Select your preferred physical device from the **Device** pop-up menu.

   Note: If the device is not listed in the **Device** pop-up menu, you may need to configure it using the Device Manager, available from the button next to the **Device** list and described in Chapter 4, "Configuring Output Formats". It is probably easier to use the `None` device to do another screen preview.
4. Assuming that you have successfully chosen a physical device, set the resolution and any other required options in this New Page Setup dialog box. Note that if you change the **Device**, you have to choose a separations style from the **Style** pop-up menu and, for some devices, a cassette name from the **Cassette** pop-up menu.
5. Click **Save As**; the RIP displays the Save Setup dialog box. In the **Save As** text field type a name: `Default to Printer` is suitably descriptive, so type that name then click **Save**.

   Note: The Harlequin RIP limits all user created names or file names to 31 bytes. This is equivalent to 31 characters when using standard ASCII text, and 15 characters when using double-byte character sets, such as Kanji.
6. Click **OK** to close the Page Setup Manager.
7. Choose **Media Manager** from the **Output** menu and select the **Disable media management** box. (You need to configure the media management before using it—that topic is covered in Chapter 8, "Media Management".)
8. Now create a new sample job as before, by choosing the **Fonts > Proof Fonts** command and choosing some fonts from the Proof Highlighted Fonts dialog box.

9. From the **Page Setup** list, select `Default to Printer` and click **Proof**.

The RIP displays the same indicators of activity: text in the RIP Monitor window, an animated picture, and one or more progress dials. Another `fontlist` job appears in the **Active Queue** and a large, empty rectangle appears just above the center of the Output Controller / Monitor and starts to fill with gray. This rectangle is known as the *progress box*. Note that in either of the single modes, the progress box appears in a separate window.

This time, when the job is being processed, watch the two gray bars that successively fill the progress box, a light gray and a dark gray spreading from the top. The light gray bar represents the amount of data the RIP has processed; the dark gray bar represents the amount that has been sent to the output device (printer).

Note: The bottom edge of the light gray bar should always be ahead of (below) the dark gray. If the dark gray catches up, the page may not be output properly—it depends how the printer reacts to having to wait for data. In this case the RIP printer buffer has probably been set too small, and you should increase its size. You can do this in the Configure RIP dialog box available from the **Harlequin RIP > Configure RIP** menu command. Typical sizes are in the range 4 MB through to 12 MB.

When the dark gray has reached the bottom of the progress box, the RIP has finished the job and the progress box clears. If the job was processed successfully, you can now pick it up from your output device. If the job does not output, or stops and starts while outputting, you may need to reconfigure the RIP or the host machine. (To help you identify a problem, the RIP Monitor window displays and records any error messages.)

The Output Controller / Monitor provides another two useful facilities:

- If you want to reprint a page once it is in the **Held Queue**, you can do so easily: just drag it with the mouse back into the **Active Queue**. Try that with the top `fontlist` job now: it is sent again to the same device,

which should be `None`. If you did the same to the other `fontlist` job (which was sent to your imagesetter or printer), the RIP would produce another hard copy.

It is very quick to output a page like this again, because it has already been processed once; the RIP stores the raster data, and just sends this data again to the relevant output device. By default, the RIP deletes processed jobs from the **Held Queue** only when it is necessary to free up disk space for new jobs.

- If you select a job and click on the **Info** button (or just double-click on the job), the RIP brings up the Throughput Info dialog box, which contains the settings for that particular job. You can change some of these settings before reprinting the job.

Note: If you are roaming a page, there are fewer available options in the Output Controller. For example, you must close the Roam window (and the Reduced Roam window if you opened it) before you can roam another page.

3.1.5 Sending a job to the Harlequin RIP

You have seen how the Harlequin RIP processes a simple job, created within the RIP. Now it is time to see how to send a real job.

If you want to print a file, you can do so directly by choosing **Print File** from the **Harlequin RIP** menu and specifying that file. Try printing a file now, if you have a small file available: for example, a PostScript-language file. The RIP interprets the file and sends it to the printer or on-screen preview, according to the page setup that you choose in the Print File dialog box.

Section 7.9 on page 298 describes this method and the following sections describe other types of files that the Harlequin RIP can print.

Usually, however, you will want to let the RIP accept input directly from other applications. We shall see how to do this using AppleTalk, and *publish* a printer visible to Macintosh computers on your network. For more details on supplying jobs to the RIP, see Chapter 7, “Configuring Input”.

3.1.5.1 Publishing a setup with AppleTalk

First, if you are outputting to an imagesetter and want to produce color separations, you should turn on HPS, Global Graphic's proprietary high-quality screening system. To do this:

1. In the Page Setup Manager select the page setup that uses this output device—we suggested `Default to Printer`—and click **Edit**.
2. Click the **Separations Manager** button (next to the **Style** list) in the Edit Page Setup dialog box to open the Separations Manager.
3. In the Separations Manager select an appropriate style from the list, for example `CMYK Separations (Halftone)`, and click **Edit** to open the Edit Style dialog box.
4. In the Edit Style dialog box, select the check box marked **Use Harlequin Precision Screening**—this enables a high-quality screening method (HPS). Click **OK** to save your change and close the Edit Style dialog box, and then click **Select** to close the Separations Manager. The name of the style that you just edited appears in the **Style** list.
5. Click **OK** twice more to exit the Edit Page Setup and Page Setup Manager dialog boxes.

Because this may be the first time you have used this screening method, HPS has to cache (save) information on disk; this may take a few minutes. This happens with each new resolution, dot shape, and screen frequency you use: the RIP displays a suitable progress dial as it caches each screen. For more information about the options in the Edit Page Setup dialog box, see Section 4.2 on page 119.

To publish a printer on the network:

1. Choose **Input Controller** from the **Harlequin RIP** menu (or bring that window to the front if there is already a check mark against that menu option).
2. When the Input Controller dialog box appears, click **New** to display the Input Channel Edit dialog box.

3. In the Input Channel Edit dialog box, choose a **Name** for the printer you are about to publish, say `Brill-O-Print`, and type it in. Select `Apple-Talk` from the **Type** menu list and select `Default to Printer` from the **Page Setup** menu list. Make sure that the **Enabled** box is selected and click **OK**.

You can leave the Input Controller dialog box displayed or close it. See if there is a check mark in front of the **Start Inputs** option in the **Harlequin RIP** menu; if there is no check mark, choose this menu option. You will see a progress dial appear as the new setup is published.

Now go to a Macintosh computer elsewhere on your network, and try to print a document. Among the available printers shown by the Chooser, you should now see `Brill-O-Print`. If you send a job to this printer, the RIP again displays the progress box filling with light and dark gray bars to show the job being processed in the usual way. The progress box is part of the Output Controller in either of the multiple modes, or a separate window in either of the single modes.

To disable a single AppleTalk input or other input temporarily, select it in the Input Controller and click **Off**. To remove an input permanently from the Input Controller, select the entry and click **Delete**.

See “Using the AppleTalk input plugin” on page 281 for more information.

3.2 A more complex use of the Harlequin RIP

You have seen how the Edit Page Setup dialog box lets you choose the output device and a variety of effects that control the appearance of the pages you display.

Many publishing environments deal with more than one kind of document. For example, suppose that you need to print a product manual in draft and final versions: draft documents need not be printed at a high resolution, but final versions should exploit the full printing quality of the output device.

The Harlequin RIP processes documents according to *page setups*. Each page setup specifies a complete page format in terms of the orientation, resolution, size, and so on; and provides a way to recall that page format, easily and exactly. For full details, see Chapter 4, “Configuring Output Formats”.

3.2.1 Saving a page setup

To make and save a new page setup:

1. Stop inputs to the Harlequin RIP if necessary. In the **Harlequin RIP** menu, make sure that there is no check mark in front of the **Start Inputs** option. Choose the **Start Inputs** option if there is a check mark: this stops inputs. Alternatively, click the **Stop Inputs** button in the tool bar.
2. Choose **Page Setup Manager** from the **Harlequin RIP** menu or click the **Page Setup Manager** button in the tool bar. The Page Setup Manager dialog box appears, where you have two choices. If there is already a similar page setup, select it and click **Copy** to display the Edit Page Setup dialog box. (If there is no similar page setup, click **New** to display the very similar New Page Setup dialog box.)
3. Edit the settings in the New Page Setup dialog box to give the configuration you want. Click **Save As**.
4. The Save Setup dialog box appears, and you can specify a name for your new page setup in the **Save As** text field. (See Figure 3.6.) Click **Save** to save the setup and return to the Page Setup Manager dialog box.

   You can verify that the setup was saved under this name by looking at the entries in the Page Setup Manager dialog box. Whenever you want to output a job manually you can use this setup by selecting its name in the **Page Setup** menu in the relevant dialog box: for example: the Print File or Proof Highlighted Fonts dialog box. You can also configure the Harlequin RIP to make named page setups available to jobs submitted by other users and applications, as described next.

   Note: You can reorder the entries in the Page Setup Manager dialog box by selecting one or more entries and dragging with the mouse. The order in the Page Setup Manager is the order of appearance in menus where you choose a page setup—typically when configuring a managed input (described in Section 7.2 on page 275) or interactively printing a file (described in Section 7.9 on page 298).

The order of page setups in the list is important in one other circumstance. From the Macintosh Finder, you can drag a file and drop it onto the Harlequin RIP icon to make the RIP print the file. When printing a dropped file, the RIP always uses the page setup at the top of the list in the Page Setup Manager.

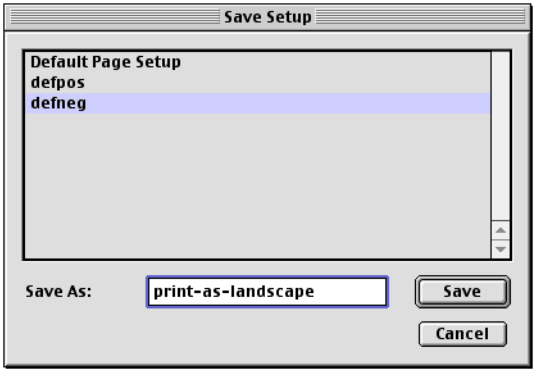


Figure 3.6 Save Setup dialog box

3.2.2 Associating a page setup with an input

Creating and saving page setups also allows you to make a published printer use a specific page setup: this allows all users of the RIP to choose a suitable page setup for a particular job by choosing the associated printer. Try the following to see how this works with just two published printers on the network:

1. Display the Page Setup Manager. Copy the page setup `Default to Printer`—select it and click **Copy**. In the New Page Setup dialog box, make no changes, just click **Save As**. Give this page setup the name `Pos`.
2. In the Page Setup Manager, select `Pos` and click **Copy** to make a copy and start editing that copy. In the **Effects** section of the New Page Setup dialog box, select the **Negative** check box and click **Save As**.
3. Save the new page setup with the name `Neg`. Click **OK** to close the Page Setup Manager.

4. Display the Input Controller and create two new AppleTalk devices, as before, called `Pos-O-Print` and `Neg-O-Print`. While using the Input Channel Edit dialog box, select the page setup `Pos` for `Pos-O-Print` and `Neg` for `Neg-O-Print`.

Once you have enabled the new inputs, and used **Harlequin RIP > Start Inputs**, the RIP publishes the two new printers on the network. Sending a job to `Pos-O-Print` causes it to be output as normal, while jobs sent to `Neg-O-Print` are output in negative.

You can publish several more inputs to the Harlequin RIP, each with different page setups. As well as changing the **Negative** setting, you can change the output device, output resolution, rotation, screening strategies, and many other settings.

3.3 Using the Harlequin RIP with a spool folder

Using a Spool Folder input, you can configure the Harlequin RIP to print files placed into a common folder, usually one accessible from other computers on your network. This means that various users or applications can write files into a spool folder. The RIP repeatedly checks this folder, and when it finds a new file, it processes the file. The RIP deletes each file from the spool folder after printing it but, using the Spool Folder Configuration options, you can instruct the RIP to save the file in another folder after printing.

The RIP associates each spool folder with a page setup, giving the benefits described in Section 3.2, “A more complex use of the Harlequin RIP”, when the RIP was published as a network printer. In particular, you can define several spool folder inputs, each with a different page setup, to match the needs of different users or applications. (If you find it convenient, you can use the same page setup with a spool folder and other types of input.)

To define a spool folder, follow these steps:

1. Choose **Input Controller** from the **Harlequin RIP** menu (or bring that window to the front if there is already a check mark against that menu option). When the Input Controller dialog box appears, click **New.** In the Input Channel Edit dialog box, choose a **Name** for the output device you

are about to publish, say `SpoolPrint`, and type it in. Choose `Spool-Folder` from the **Type** menu and for **Page Setup** choose an appropriate page setup.

Click **Configure** to specifyor more information. Exit the Spool Folder Configuration dialog box by clicking **OK**.

2. In the Input Channel Edit dialog box, select the **Enabled** box and click **OK** to exit. If necessary, choose **Start Inputs** from the **Harlequin RIP** menu. You will see a dial appear as the new setup is published.

   This starts the spool folder and any other enabled inputs. If there are files already in the spool folder, the RIP asks if you want to start by printing them. Files that are put into the folder after this input is enabled are rendered and printed in order of arrival in the folder.

   Note: The RIP may fail to publish a spool folder input. If so the relevant entry in the **Status** column of the Input Controller dialog box shows `Stopped`. The most likely reason is that you have tried to use a folder already in use by another spool folder input: return to the Spool Folder Configuration dialog box and choose a new folder.

3. When you want to stop running the spool folder (and all other enabled inputs), choose **Start Inputs** in the **Harlequin RIP** menu again.

To disable a spool folder temporarily, select it in the Input Controller and click **Off**. To remove a spool folder's entry in the Input Controller, select the entry and click **Delete**. (Removing the entry does **not** remove the associated folder on disk, nor any contents of that folder.)

Note: Even though PostScript Language compatibility level 1 is rarely used, you should note that the spool folder plugin does not work with page setups set to PostScript Language compatibility level 1.See Section 4.23.1 on page 195 for more information. If this is attempted an "undefined" on "findresource" error will occur.

3.4 Monitoring the Harlequin RIP

The RIP Monitor window shows the progress of jobs through the Harlequin RIP. The text displays information about timing, errors, job completion, fonts, and other messages.

To see this window if it is not visible, select **RIP Monitor** from the **Harlequin RIP** menu. Alternatively, hold down the Command key and press M: that is, type Command-M. Repeat this command to hide or redisplay the RIP Monitor window.

Figure 3.7 shows some example messages in the RIP Monitorwindow.

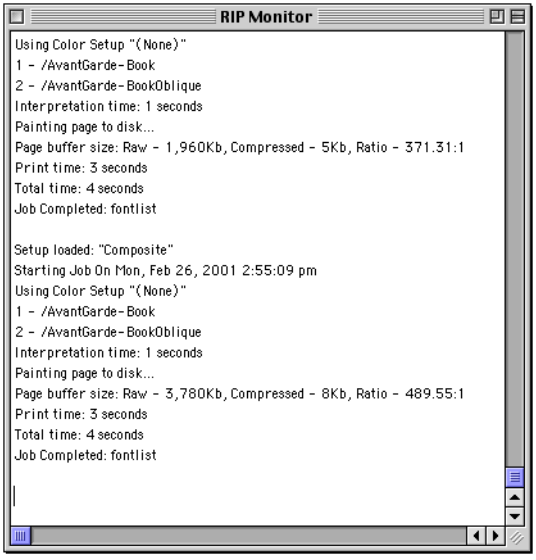

RIP Monitor
Using Color Setup "(None)"
1 - /AvantGarde-Book
2 - /AvantGarde-BookOblique
Interpretation time: 1 seconds
Painting page to disk...
Page buffer size: Raw - 1,960Kb, Compressed - 5Kb, Ratio - 371.31:1
Print time: 3 seconds
Total time: 4 seconds
Job Completed: fontlist
Setup loaded: "Composite"
Starting Job On Mon, Feb 26, 2001 2:55:09 pm
Using Color Setup "(None)"
1 - /AvantGarde-Book
2 - /AvantGarde-BookOblique
Interpretation time: 1 seconds
Painting page to disk...
Page buffer size: Raw - 3,780Kb, Compressed - 8Kb, Ratio - 489.55:1
Print time: 3 seconds
Total time: 4 seconds
Job Completed: fontlist

Figure 3.7 RIP Monitor window messages

The RIP Monitor window displays only messages since the start of the RIP session and can display the last 32,000 characters of these messages. (Within this limit, you can scroll back to inspect the messages for old jobs: the window scrolls back to the end when new text appears.)

In Multiple (Parallel) mode—the default page buffer mode—timings require careful interpretation, because the RIP may be outputting and interpreting jobs at the same time. Also, if the RIP has to pause (for example, to wait for disk space to be freed), the timings may be misleading because of the variable time spent freeing space.

The RIP adds a copy of all the messages appearing in the RIP Monitor to a file, called `LOGFILE`, in the `SW` folder.

The size of the log file can be restricted by editing the `GeneralPreferences` text file found within the `Config` folder in the `SW` folder.

By changing the value of `/MaxLogfileSize` to any value other than `0` will specify the maximum size of the file in bytes. When this maximum value is reached `LOGFILE` will be changed to `LOGFILE.OLD`.

The size of the file is checked when the RIP is started and each time a message is written to the file. Only one `LOGFILE.OLD` is retained. Therefore, you must be aware of the size of the log files and rename them to keep all messages.

Note: You will only see messages that have been added to the log file since you started the current RIP session. To view the entire contents of the log file including messages from any earlier sessions, you must use a text editor like SimpleText as supplied by Apple. If the log file is larger than about 64,000 characters, you may need to use a more powerful application than Simple-Text; try Microsoft® Word if you have it available or a shareware application such as BBEdit or Alpha.

The log file is an important source of information when difficulties arise. Refer to it if you have any problems.

Note: From Eclipse Release SP3 Font backup no longer backs up logfiles with the prefix `LOGFILE`. Thus copies of logfiles whose names do not start with `LOGFILE` will be included in font backup files.

4

Configuring Output Formats

Chapter 3, "Getting Started with the Harlequin RIP", presented some of the basic ways of getting output from the RIP. That chapter introduced the Page Setup Manager and Edit Page Setup dialog box and showed how you can use page setups to choose the output device and many output options.

This chapter describes the details of these dialog boxes and discusses likely output devices.

4.1 Creating and managing page setups

Every job that you supply to the RIP takes its imaging options from a named page setup. This is true both for jobs arriving through a managed network input defined in the Input Controller, and for jobs that are the result of you choosing a menu option in the RIP, for example: **Proof Fonts** or **Print File**. (These menu options can be a useful way to test new page setups.)

You can keep a number of different page setups which you use regularly—perhaps one that has Harlequin Precision Screening (HPS) turned on, and one that does not, one that previews images, and one that sends output to a particular printer. You can save as many configurations as you wish.

Page setups are such an important part of the RIP that you must name each one as you create and save it. You can use up to 30 characters in a name. It is

useful to give each page setup a meaningful name, without being too specific about its contents.

- Choose a meaningful name because the page setup name appears in several menus where you have to choose a page setup. Also, for each job, the RIP displays a message in the RIP Monitor saying which page setup it used.

  Choose a form of name that suits the variety of jobs and output devices that you work with. Consider making the name contain parts indicating the output device, and settings such as resolution. Another tactic might be to label a page setup with its general purpose, for example: proofing or final output.

- Try not to be too specific because you can change the settings within a page setup without changing its name.

  For example, this can be useful if you change the device you use for proofing. If you have several networked inputs that each use the same page setup, it is easier to edit just one page setup than to create a new page setup and then change all the inputs to use the new page setup.

You can give an experimental page setup a less carefully chosen name, but try to make it clear that it is not for routine use.

4.2 Page Setup Manager dialog box

The Page Setup Manager dialog box appears when you choose **Page Setup Manager** from the **Harlequin RIP** menu, or when you type Command-S. (You must stop inputs before you can display the Page Setup Manager: if necessary, choose the **Harlequin RIP > Start Inputs** menu option or click the tool bar button that shows a red arrow and traffic lights.)

Figure 4.1 Page Setup Manager dialog

The Page Setup Manager contains a list of all existing page setups, showing the name of each page setup, the corresponding output device and some important settings: the output resolution, the calibration set in use, and the separations style.

In a new installation of the RIP, there is always one page setup called `Default Page Setup`. This page setup uses a set of options that can be expected to work with any installation of the RIP, producing a low-resolution on-screen preview. You can delete or redefine this page setup to suit your installation.

4.2.1 Controls and actions

The controls below the list allow you to create new page setups, and to edit, copy, or delete existing page setups. You can also choose the units in which to view the resolution of output listed for each page setup.

Edit — Select a page setup and click this button to edit it in the Edit Page Setup dialog box. A shortcut is to double-click a page setup. See Section 4.3 on page 119 for details of using this dialog box.

Note: To rename a page setup, copy it and save the copy with the desired name, before deleting the original.

New — Click this button to create a new page setup and edit it in the New Page Setup dialog box. See Section 4.3 on page 119 for details of using this dialog box.

Copy — Select a page setup and click this button to edit a copy in the New Page Setup dialog box.

Delete — Select one or more page setups and click this button to delete them.

If any of the page setups are in use by a managed input, the RIP displays a warning dialog box for each used page setup. Click **Yes** if you are certain that you want to delete the page setup.

4.2.2 Reordering page setups

You can also select page setups and reorder them by dragging them to new positions in the list. The order in the Page Setup Manager is the order of the

page setups listed in the Print File, Proof Fonts, and Print Calibration dialog boxes and in the Select Page Setup dialog box shown before entry to the Executive window.

Note: The order of page setups in the list is important in one other circumstance. From the Macintosh Finder, you can drag a file and drop it onto the Harlequin RIP icon to print that file. When printing a dropped file, the RIP always uses the page setup at the top of the list in the Page Setup Manager dialog box.

4.2.3 Selecting several page setups

You can select multiple page setups when you want to delete or reorder them. Use the following keys:

To select a block of setups that appear together in the list, select the first setup in the block, then, while holding down the Shift key, select the last setup in the block.

To select several setups, regardless of whether they form a continuous range, hold down the Command key while selecting the setups.

4.2.4 Closing the Page Setup Manager

You must close the Page Setup Manager before you can use any tool bar buttons or menu options in the RIP: for example, to start inputs.

You have these choices:

- Click **OK** to confirm all the changes you have made in the Page Setup Manager or in the Edit Page Setup or New Page Setup dialog boxes.
- Click **Cancel** to discard all changes.

4.3 Edit Page Setup dialog box

The Edit Page Setup dialog box (shown again in Figure 4.2) appears when you click **Edit** in the Page Setup Manager. The New Page Setup dialog box appears when you click **New** or **Copy**. The New Page Setup dialog box is the same as the Edit Page Setup dialog box, except that the **OK** button is labeled **Save As**. See Section 4.3.2, "Closing the New Page Setup dialog box" for details. References to the Edit Page Setup dialog box throughout this manual also apply to the New Page Setup dialog box.

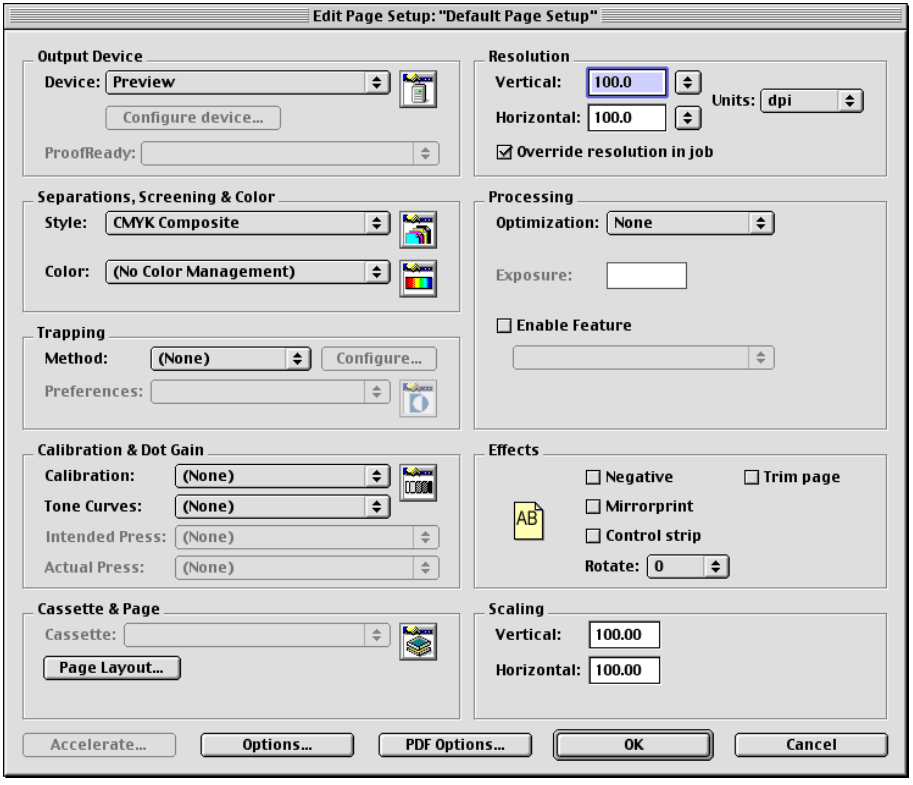


Figure 4.2 Edit Page Setup dialog box

The options you can configure from the Edit Page Setup dialog box include:

- The device to which the RIP sends output.

- The separations to be created from each job, together with the output format.
- The halftone screening to be used with each job.
- The calibration to be applied to each job.
- The color setup for the job.
- The effects to be applied to input jobs.

Section 4.4 on page 122 through Section 4.27 on page 209 describe the options within these categories. Many options involve subsidiary dialog boxes.

All the information that you need to create a page setup is available from the Edit Page Setup dialog box. You can call the Device Manager, Separations Manager, Color Setup Manager, Calibration Manager, and the Cassette Manager from the Edit Page Setup dialog box.

The changes you make in these managers are independent of the page setup you are creating. For example, you can use the Separations Manager to create a separations style, even if you do not want to use that separations style in the page setup.

4.3.1 Closing the Edit Page Setup dialog box

You must close the Edit Page Setup dialog box to save your changes. You must also close the Page Setup Manager before you can use any tool bar buttons or menu options in the RIP: for example, to start inputs.

Click **OK** to confirm all the changes you have made in the Edit Page Setup dialog box. This confirmation is provisional: you must also click **OK** in the Page Setup Manager to finally save your changes.

Alternatively, click **Cancel** to discard your changes immediately.

Note: If you open one of the other managers from the Edit Page Setup dialog box, changes that you make in that manager are independent of the Edit Page Setup dialog box. For example, if you open the Separations Manager and create a separations style, as long as you close the Edit Style and Separations Manager dialog boxes with **OK** or **Select**, the new style will remain even if you click **Cancel** in the Edit Page Setup dialog box.

4.3.2 Closing the New Page Setup dialog box

You must close the New Page Setup dialog box to save your changes. You must also close the Page Setup Manager before you can use any tool bar buttons or menu options in the RIP: for example, to start inputs.

If you click **Save As** in the New Page Setup dialog box, a dialog box appears, requesting that you enter a name for the new page setup. Figure 4.3 shows this dialog box.

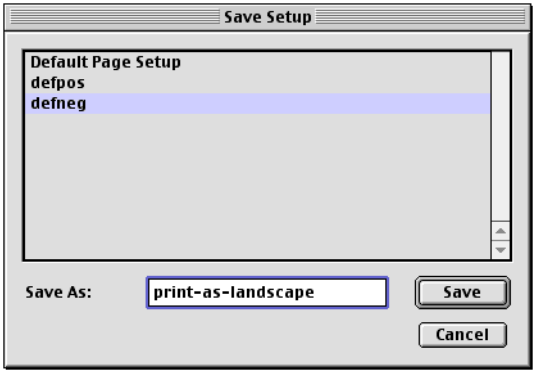


Figure 4.3 Save Setup dialog box

The dialog box shows a list of existing page setups. You have these options:

- Type a name in the **Save As** text box and click **Save**. The new page setup is added to the list in the Page Setup Manager.
- Select a name from the list of the page setups to transfer it to the **Save As** text box. You can edit the name first or click **Save** immediately to overwrite the existing setup.
- Click **Cancel** to return to the New Page Setup dialog box.

If you attempt to save a setup using an existing name, the RIP asks you to confirm the action before overwriting the existing setup. If you answer **No**, you return to the Save Setup dialog box where you can choose another name.

Once you have saved the page setup, you must also click **OK** in the Page Setup Manager to finally save your changes.

4.4 Selecting different devices

The **Device** pop-up menu in the Edit Page Setup dialog box allows you to specify where your output is to be sent once the job has been interpreted.

You can send output to a physical printer, write it to a file in a specified format, or preview the file on your screen. Although the precise configuration of available devices may vary, the following output devices are always shipped with the evaluation copy of the RIP:

- Preview—enables you to preview on your monitor any jobs processed. This output device is available in both single and multiple modes.
- None—does not produce any printed output, but does perform all the necessary processing for the job, including the production of page buffers. This can be used for testing and timing jobs, and is especially useful for previewing on screen when you want to jump between pages or overlay separations using the Output Controller. The Output Controller is available in either of the multiple modes.
- TIFF—produces TIFF (Tag Image File Format) files. Most desktop publishing applications can import this format of file.

And, depending on which physical output devices are available:

- Plugin devices, for example, Ultre, PelBox and Hewlett Packard HP650.

Note that if you change the **Device**, you may have to choose a separations style from the **Style** pop-up menu and a cassette name from the **Cassette** pop-up menu before you can save the page setup.

4.4.1 Setting the resolution

Under **Resolution**, there are two options that allow you to specify the *resolution* of the image to be printed. The resolution defines the detail with which an image is printed or displayed, and is given in terms of dots per inch (dpi).

The list of available resolutions varies between output devices. Most physical output devices support a limited number of resolutions and you must choose from the values shown in the pop-up menus. For some devices (such as TIFF) you can either type in a resolution or choose one of the values.

Normally the vertical and horizontal resolutions should be the same value: this is your only option when the screening method is HDS or when the chosen output device requires the same vertical and horizontal resolution. For other screening methods and with other output devices you can set the resolutions to different values—if you need to.

- Set both resolutions at once by defining just the vertical resolution—the horizontal resolution is automatically set to the same value.
- Set different vertical and horizontal resolutions by setting first the vertical and then the horizontal resolution.

Note: The resolutions shown in this dialog box always take effect for jobs that do not specify a resolution. If the job attempts to specify the resolution, you must select the **Override resolution in job** check box if you want to produce the resolution shown here.

4.4.2 Image interpolation

When an image is at a different resolution to the device on which it is to be imaged, artifacts can be introduced with various degrading visual effects. Image Interpolation attempts to eliminate these effects, using extra processing to effectively recreate the image specifically for the device.

Image Interpolation works both ways: reducing the resolution of the image to match an output device with a lower resolution and increasing the resolution of an image to match an output device with a higher resolution.

4.4.2.1 Increasing image resolution

If you input an image that has a resolution which is slightly lower (between 50%-100%) than the resolution of the output device, the resulting image appears with “jaggies”. Image interpolation will generally eliminate this type of problem, with very little (if any) perceptible loss of image quality.

If you input an image that has a resolution which is significantly lower (50% or less) than the resolution of the output device, the resulting image appears “blocky”. Image interpolation will smooth such images giving a blurry look. If the resolution of the original image is reduced more when compared to the output device, the output becomes more blurry.

In practice, you can still get jaggies when the image has a resolution that is significantly lower in resolution, but their effects are not as pronounced as in the slightly lower case.

It is a good idea to run some tests and decide whether or not to use image interpolation.

Image interpolation works by producing a smooth transition between adjacent sample values rather than painting all pixels covered by a source sample with the same color.

There is a performance penalty when interpolation takes place, and this penalty is related to the area of the output image, and to whatever color management is taking place.

Because it may increase the time required to render the image, image interpolation is disabled by default; and is only enabled when the width or height (or both) of an image on the device is larger than the corresponding dimension of the source. If either dimension of the image on the device is less than that of the source, the filter will be deactivated.

Image interpolation only ever takes place if the Interpolate flag in an image or mask dictionary is set to “true” and this is set by the generating application.

Image and mask interpolation is disabled by default.

You can specify that image and mask interpolation takes place if the Interpolate flag in an image or mask dictionary is set to “true”, or you can force all images to be interpolated.

Note: Interpolation (image and mask) is not supported for type 4 images.

Image interpolation increases the resolution of the image to the device resolution by increasing the bit depth of the image. For example, a 1 bit grayscale image will interpolate to, say, an 8 bit image, with a smooth gray scale transition between each black and white pixel.

Image mask interpolation produces output that is 4 times higher in resolution than the input, but it can run up to three times in a row, providing at most 64

(4 x 4 x 4) times higher resolution output. The mask interpolator uses two criteria to choose if higher resolution output is needed:

- If the source mask width and height are *both* higher than the device resolution, stop.
- If *either* the source mask width *or* height are more than 150% of device resolution, stop.
- Otherwise, interpolate again.

The second check is concerned with images whose source data is not square, but they have been transformed so that on the device they are close to becoming square. This is to avoid the larger side of the image becoming very large as the smaller side tries to achieve the device resolution.

4.4.2.2 Reducing image resolution

When an image is reduced on an output device, rows and columns of the source image are discarded to make the image fit in the desired area.

Some images are generally unaffected by this process—photographs for example. However, some images, such as technical drawings can become badly affected. When an image contains many fine horizontal and vertical lines they can become badly distorted or even lost completely by the process naively discarding whole columns and rows.

The image reduction filter eliminates this kind of problem by resampling the whole image to the device resolution, ensuring that all pixels in source image are represented on the output. Thin lines on a white background would become more faint as the image is reduced, rather than be discarded completely.

Any reduced image may benefit from the reduction filter—however images containing fine line detail will show the most benefit.

Although some processing time is required, the reduction filter can, in some cases, speed up processing as it reduces the amount of information the RIP has to work with. In particular, large, high-resolution images being output on a relatively low-resolution device (1200 dpi image on a 300 dpi device) may notice a speed improvement, particularly if the job is using color management.

The image reduction filter only becomes active when the width or height (or both) of an image on the device is smaller than the corresponding dimension of the source. If either dimension of the image on the device is greater than that of the source, the filter will be deactivated.

4.4.2.3 Alphamask and Interpolation

When specifying an alphamasked image, any interpolation setting in the mask dictionary is ignored; instead the interpolation setting in the image data dictionary is applied to both the image and mask.

Since alphamasks are contone, they are interpolated in the same way as image data. Image and mask data (that is, contone and binary data) are normally interpolated differently.

4.5 Sending output to the screen

There are two output devices that are provided for sending output to the screen: `Preview` and `None`. `None` is the more flexible choice if you are running the RIP in the Multiple or Multiple (Parallel) page buffer mode.

`None` is a dummy device provided for test runs and for previewing, so no physical printing takes place. You can preview the pages sent to the `None` device using the **Roam** command from the Output Controller in the same way as you can preview the pages sent to an actual device. You can roam several pages at once if they are the same size, which allows you to view selected separations of a color image together or to compare buffers for the same page when processed with different page setups. You can also hide one or more separations when previewing a composite image. The Output Controller is only available in either of the multiple page buffer modes.

`Preview` is also a dummy device, and it enables you to preview individual separations, a composite image, or selected colors of a composite image in all page buffer modes. The `Preview` device does *not* allow you to combine pages or separations for viewing, and jobs sent to `Preview` do not appear in the Output Controller.

4.5.1 Using the Preview device

By setting the output device to `Preview`, you can preview any jobs processed on your monitor. As a separate output device, Preview is most useful when running in Single or Single (if required) modes, when the Output Controller is not available. The RIP pauses all job processing while you are viewing a page and resumes only when you close the Preview window.

When you print a file to the `Preview` device, a new window appears containing the image processed, as shown in Figure 4.4.

Figure 4.4 Preview window

You have already seen an example of screen roam in Chapter 3, "Getting Started with the Harlequin RIP". Using screen preview as a device gives you the same options as screen roam. You can preview up to 24-bit RGB or 32-bit CMYK raster images, as long as you have sufficient memory. If you have installed an N-color device, you can also roam N-color images.

Navigation in the Preview window is the same as in the Roam window. For details see "Roam and Preview windows" on page 128. You can hide one or more separations when previewing a composite image. See Section 4.5.3.1, "Roam Options and Preview Options dialog boxes" for details.

4.5.2 Using the None device

When running in a multiple page buffering mode, you can preview pages from within the Output Controller by clicking the **Roam** button. (See Section 5.3.2 on page 30.) By setting the output device to `None`, you can carry out test runs, and preview pages and separations.

You have already seen an example of screen roam in Section 3.1, “A simple Harlequin RIP session” on page 95. As you saw in that example, when you print to the None device, you can select a page in the **Held Queue** of the Output Controller and click **Roam**. The Roam window appears. The title bar of the Roam window contains the name of the file, the resolution and the color of the page or pages. You can view any page in any queue of the Output Controller, not just the pages you printed to the None device.

To roam more than one page at once, select all the pages you wish to preview and click **Roam**; the selected pages will be overlaid in the Roam window. For example, this allows you to preview some or all separations of a color image together. Remember, you can select several page buffers using the Shift and Command keys.

If you roam the separations of a color image or if you are roaming a composite image then the combined image may become difficult to interpret, particularly if any of the separations have similar colors. There are ways to reduce the complexity:

- You can hide one or more separations as you are roaming the separations until all but one separations are hidden. See Section 4.5.3.1 on page 130 for details.
- You can choose to display a separation in any color (in the Info dialog for that separation) before starting to roam it. See Section 11.11.3 on page 467 for details.

The Roam and Preview windows are described in detail in the following sections.

4.5.3 Roam and Preview windows

Note: This description applies to both Roam and Preview windows. For ease of description, this section refers to the Roam and Reduced Roam windows only: the same description applies to the Preview and Reduced Preview windows except that the word **Roam** in menus becomes **Preview**.

When previewing pages, the size of the image is proportional to the resolution chosen in Edit Page Setup: the higher the resolution, the larger the image appears. Choose a high resolution if you want to look at a processed image in fine detail; choose a lower resolution to see the whole image at once.

When you are viewing a higher resolution image, the **Roam > Reduced Roam** menu option is probably available in the Roam window. It allows you to see more of the image in one view. You must close the Roam window (and the Reduced Roam window if you opened it) before you can roam another page.

For most sizes of page, there are horizontal and vertical scroll bars at the edges of the Roam window. (The scroll bars appear only when the window is too small to display the whole page at one time.) When there are scroll bars, you can use them to move your view to different parts of the page image. Alternatively, you can drag the page image around by holding down the left mouse button when the cursor is over the image and moving the mouse. While you are dragging the image, the shape of the mouse cursor changes to a hand. The hand speed determines how quickly the image moves when you move the mouse. You can set the hand speed, together with other options, in the Roam Options dialog box. See Section 4.5.3.1 for details.

For an accurate indication of what part of the page is visible hold down the Command key (sometimes called the Apple or Cloverleaf key): a rectangle appears. This rectangle shows you how much of the page is visible in the Roam window and which portion of the page you are looking at. For example, if the rectangle is shown in the bottom right of the window, the bottom-right portion of the page is visible in the window. Hold down the Command key and click the mouse (Command-click) to jump to another part of the page. For

example, if you Command-click on the middle of the window, the window scrolls to show the middle of the page.

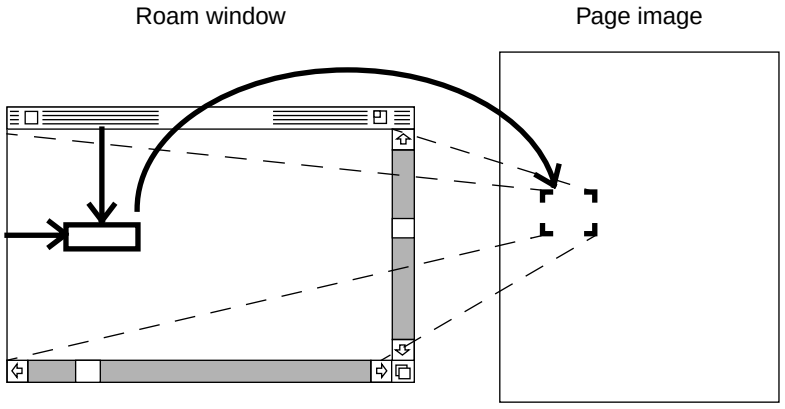


Figure 4.5 Command key held down in Roam window

Arrows are drawn from the edges of the window: this is a reminder that the rectangle is proportional to the dimensions of the window. Typically, the shape of the window does not match the proportions of the entire page so the scaling for height and width is not the same.

4.5.3.1 Roam Options and Preview Options dialog boxes

Note: This description applies to the options for both the Roam windows and the Preview windows. For ease of description, this section refers to the Roam and Reduced Roam windows only: the same description applies to the Preview and Reduced Preview windows.

Display this dialog box by choosing the **Options** command from the **Roam** menu in either the Roam window or the Reduced Roam window.

Figure 4.6 Preview Options dialog box

The Preview Options dialog box contains a list of the separations shown in the Roam window and the Reduced Roam window.

You can use this dialog box to choose the separations that are displayed. Select a separation, or use the Shift or Command keys to select multiple separation names, then click one of these buttons:

On Displays the selected separation or separations.

Off Hides the selected separation or separations. You cannot use this button if using it would hide all separations.

The other controls do not require a selected separation.

Color display By default, the RIP displays the page image as quickly as possible. If you prefer a more accurate (but slower) display of colors, select **Accurate** from the **Color display** popup menu. (This control may be unavailable if there are restricted display colors because of hardware limitations or display modes chosen in the operating system.)

Hand speed The hand speed determines how quickly the image moves when you move the mouse. If you find that the page image moves too quickly, you can slow down the hand speed by selecting **Medium** or **Slow** from the **Hand speed** popup menu.

You can close the Roam Options dialog box using the **Roam > Options** menu option again. Alternatively, closing the Roam window will also close the Roam Options dialog box. If you do not close the Roam Options dialog box explicitly, it will be displayed the next time you preview pages.

4.5.3.2 Reduced Roam and Reduced Preview windows

When viewing a large or high resolution image, the **Roam > Reduced Roam** menu option is probably available in the Roam window. It allows you to see more of the image in one view. You must close the Roam window (and the Reduced Roam window if you opened it) before you can roam another page.

When the Reduced Roam window is displayed in front, hold down the Command key. A rectangle is drawn on the image in the Reduced Roam window, marking the part of the page which is being shown *in the (full-size) Roam window*. (If only a little of the rectangle is visible, a circle is drawn around it to make it easier to see. Also, if part of the rectangle lies outside the Reduced Roam window, the edge of the rectangle is marked with an arrow head pointing in the appropriate direction.)

If you Command-click at a particular point in the Reduced Roam window, the view in the Roam window scrolls to center on that point on the page.

If you Command-drag with the mouse (hold down Command key, then press

and hold the mouse button), you can range over the part of the page which is visible in the Reduced Roam window.

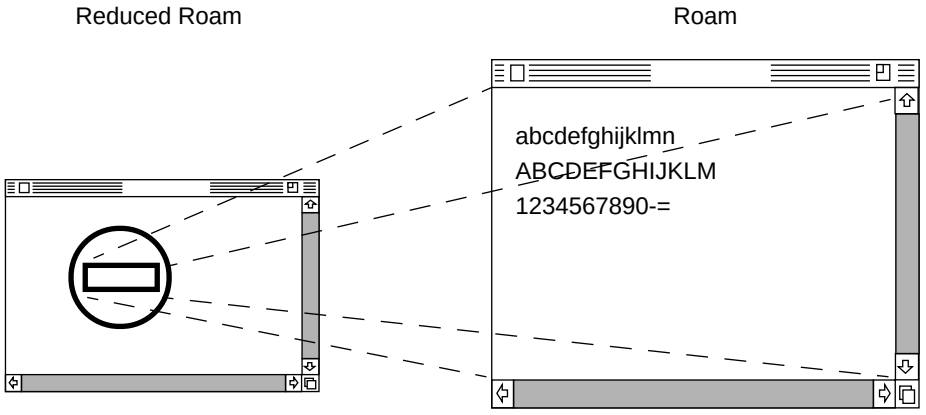


Figure 4.7 Command-click in Reduced Roam window

4.6 Output to Preview

By setting the output device to `Preview` in the Edit Page Setup dialog box, you can preview any jobs processed on your monitor. Using screen preview as a device gives you the same options as screen roam. As well as navigating a preview of an image, you can display a reduced preview window, which shows the same image reduced in size.

If you are running the RIP in one of the multiple modes and wish to preview jobs, you may find it useful to process those documents using `None`, and then preview each page buffer separately from within the Output Controller by clicking the **Roam** button.

Under **Separations, Screening & Color**, the **Style** pop-up menu contains all the separations styles created for the `Preview` device. The choice of separations style determines the color space and format of the output.

See Section 4.5 on page 126 for further information about the `Preview` and `None` devices.

4.7 Output to None

The None device option available in the Edit Page Setup dialog box does not produce any printed output, but it does perform all the required processing for the job, including the production of page buffers in the appropriate modes. This can be used for testing and timing jobs, and is especially useful for previewing on screen when you want to jump between pages or overlay separations using the Output Controller.

Under **Separations, Screening & Color**, the **Style** pop-up menu contains all the separations styles created for the None device. The choice of separations style determines the color space and format of the output.

Note: The Output Controller is only available in either of the multiple modes. You can preview a page in one of the single modes by setting the output device to Preview instead of None.

See Section 4.5 on page 126 for further information about the Preview and None devices.

4.8 Output to TIFF

The Harlequin RIP can produce TIFF (Tag Image File Format) files, which you can choose by selecting the TIFF output device in the Edit Page Setup dialog box. Most desktop publishing applications can import this format of file.

The Harlequin RIP produces TIFF files which are compatible with TIFF 5.0, Classes B (bilevel), G (gray scale), and R (RGB color). CMYK color separations are also supported as defined in the published TIFF 6.0 specification, Appendix K.

Note: From Eclipse Release SP4, if a TIFF file of 4GB or more is produced the output will abort, and a “File size overflow” message will appear.

Under **Separations, Screening & Color**, the **Style** pop-up menu contains all the separations styles created for the TIFF device. The choice of separations style determines the color space and format of the output.

Note: The TIFF file is complete when it appears in the file system with the name requested by the user, primarily to ease any subsequent, automatic processing of the file. (To make this possible, the RIP produces, and then removes,

an intermediate file with the suffix `.TMP`, or the suffix `.TEM` if the requested name has extension `.TMP`.)

You can configure how the RIP produces and names TIFF files by clicking **Configure Device** in the Edit Page Setup dialog box, when the selected output device is `TIFF`. Alternatively, if you are running the RIP in one of the multiple modes, the device of any page buffer in the Output Controller can be configured by clicking **Configure Device** in the Info dialog box of that page buffer.

Figure 4.8 shows the TIFF Configuration dialog box.

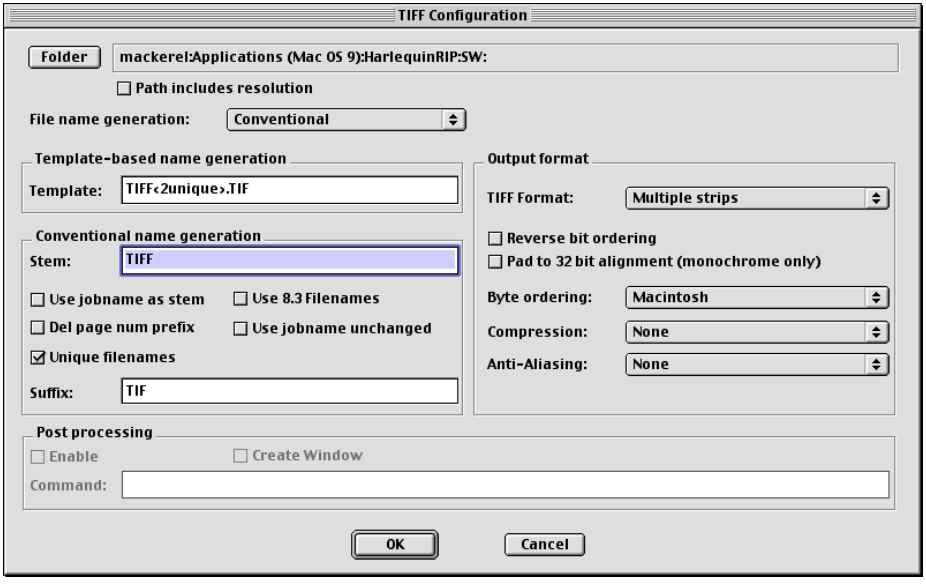


Figure 4.8 TIFF Configuration dialog box

The options in this dialog box fall into categories—location and naming, file format, and post processing—as described in the following subsections.

4.8.1 TIFF file location and naming options

Choose the folder in which the Harlequin RIP places files by clicking the **Folder** button and choosing a folder from the dialog box—select the folder in the list and then click **Select**. The TIFF Configuration dialog box then shows

the path to the folder that you chose, using the colon (:) character to separate the name of each folder from that of the containing folder.

If **Path includes resolution** is selected, the RIP places any TIFF files created in a sub folder of your chosen folder with the name of that sub folder set to the resolution of the job: for example, `300` or `2400`.

From the Harlequin RIP Eclipse Release SP4 two naming options are available; **Conventional** and **Template-based** file name generation. Conventional file naming is much the same as previous versions. Template-based file naming uses various tags to generate the name. This method has previously been used in a number of Harlequin RIP plugins.

Choose the method you wish to use by selecting the option in the **File name generation** field.

4.8.1.1 Template-based name generation

Selecting **Template-based** in the **File name generation** text box allows you to specify the automatic generation of an output file name using a template of fixed text and tags. When this method is selected, only the **Template** field is used for file name generation. All options in the **Conventional name generation** section are ignored (inlcuding the **Suffix** field).

Most tags are content tags, representing variables such as the date and time a job is processed; the other tags allow you to reject names that would be illegal in a specified operating system.The maximum length of variables can be specified by preceding the tag name with an integer. For example, `<5jobname>` truncates the job name to a maximum of five characters. Tags that produce numeric values are truncated from left to right, whereas tags that produce alphanumeric strings (strings containing the characters a-z, A-Z, and 0-9) are truncated from right to left. See the example below for further details.

Fixed text can be part of the file name stem or extension. For example, *`stem_`*`<3unique><sepname><dot>tif` would generate a file name of the form: *`stem_`*`000Cyan.tif`, in which *`stem_`* can be any identifying text.

Try to use a file name extension that does not clash with any established convention.

Note: This file naming scheme does not provide useful file names derived from job names that contain double-byte characters.

The default when **Template-based** is selected but the template field is left blank is:

```
TIFF<2unique>.TIF
```

This means that when 100 files have been processed the RIP will stop.

The following tags are available and can be used in any order:

Tag	Description
<colorant>	The color space of the device, such as DeviceCMYK, DeviceRGB, or PhotoInk.
<colorname>	The name of the separation, such as Cyan.
<date>	The date when the job is processed, in the format YYYYMMDD, unless a truncated form is specified.
<dot>	Separates the stem of the file name from the file extension, and appears as a period character (.) in the file name. For example, *stem*<dot>*ext* appears as stem.ext. The use of the <dot> tag enables the verification of the stem and extension lengths.
<exposure>	The exposure setting, a device specific integer.
<job#>	The job number allocated by the RIP. Automatic numbering means that successive jobs have incremented job numbers: 000, 001, 002, 003, and so on.
<jobname>	The page buffer name without the page number prefix and without characters illegal to the operating system. White space characters are used, if present in the job name.
<jobname1>	The page buffer name without the page number prefix, and using only alphanumeric characters (a-z, A-Z, 0-9). White space characters are *not* used.
<page#>	The page number (allocated by the RIP), within the current job. For example: 002.
<prefix>	The page number prefix from the page buffer name, such as 1., 2., and so on.
<prefix-only>	You can use this tag to include the characters from the prefix before the fullstop in the job name.

Table 4.1 Output file name tags

Tag	Description
`<realpage#>`	The page number is determined using the HqnPageCounter procset. This is zero if the HqnPageCounter procset is not available.
`<time>`	The time when the job is processed, in the 24-hour format `HHMMSS`, unless a truncated form is specified.
`<unique>`	A unique sequence number used to make file names unique when outputting files to a directory.
`<xres>`	The horizontal resolution of the page, as specified in the page setup.
`<yres>`	The vertical resolution of the page, as specified in the page setup.

Table 4.1 Output file name tags

The legality of an automatically generated file name is always checked against the requirements of the operating system on which the RIP is running.

To enable portability of files from one operating system to another, you can also use tags to specify the operating system for which generated file names must be suitable. The use of these tags changes the rules by which a file name is deemed valid. The tags do not modify the file names generated, but cause error messages if the file name is invalid.

For example, you can create the template `<dos>Averylongfilename.tif`, but an error is generated. This error occurs because DOS file names require the 8.3 format for stem and extension, which this template fails to meet by having 17 characters in its stem. Table 4.2 lists the operating system tags.

Tag	Description
`<dos>`	Verifies that the file name is a legal file name for the MS-DOS operating system.
`<mac>`	Verifies that the file name is a legal file name for the Macintosh operating system.
`<unix>`	Verifies that the file name is a legal file name for the UNIX operating system.
`<win32>`	Verifies that the file name is a legal file name for Windows operating systems.

Table 4.2 Operating system tags

Note: Illegal characters which would cause an error on a particuar platform are removed.

The following examples demonstrate the format of strings produced by individual tags. Some examples also show how the tags may be used in combination to form a template. The examples are based on these job details:

Page buffer name: 1. TestPage: Section 20-Book 9

Date: 12th of May, 2004

Note: When creating multiple copies of a file, the same page buffer provides tag information. If a template contains dynamic tags (such as `<time>`, where the value changes each time that a page buffer file is output), then multiple copies of the file are created. If the template contains just static tags (such as `<jobname>`, where the job name remains constant), a single output file is created. If there is no uniqueness in the name, because the file already exists, a message to that affect is sent to the RIP monitor and output fails with a "file creation error".

`<colorant>`

This tag includes the color space of the device in the file name string.

For example, the template `<colorant><dot>tif` produces a file name of the form `PhotoInk.tif` for a device using a PhotoInk color space.

`<colorname>`

The tag `<colorname>` can be used to include the name of the separation in a file name, for example: `Cyan`. You can include just the first letter of the separation by using the tag `<1colorname>`, which truncates the separation name to its first letter. If a composite style is used this is indicated by the string `Composite`. If a monochrome style is used this is indicated by the string `Gray`.

`<date>`

The template `<date><dot>tif` produces the file name `20040512.tif`. You can remove the year information by using the tag `<4date>` to produce the file name `0512.tif`.

`<dos>`

The use of this tag verifies that the file name is suitable for use in a DOS operating system. Illegal characters, such as a colon and white space characters which would cause an error, are removed.

For example, the template `<dos><jobname><dot>tif`, would generate an illegal file name because the job name is greater than the eight characters allowed in DOS operating systems. Truncation can be forced by using the template `<dos><8jobname><dot>tif`, which produces the file name `TestPage.tif`.

`<dot>`

This tag separates the file name stem from the file name extension and enables the verification of their lengths. It is particularly necessary when creating file names compatible with DOS and Windows, otherwise the extension may be considered as part of the file name.

For example, the template `<dos><8jobname>.tif` would cause an error because the dot is removed as an illegal character and `tif` is then considered part of the file name stem.

`<job#>`

You can use this tag to include the job number in the file name string. The default length of the number is three digits, so the first file name created with this tag would be 000, unless a different length is specified. You can specify the length of the job number by preceding the `<job#>` tag with an integer. For example, `<5job#>` creates job numbers five digits long.

In multi-page jobs use the `<page#>` tag as well as the `<job#>` tag to differentiate between the different pages of a job.

`<jobname>`

This tag ensures that only legal operating system characters are used in the job name.

For example, in the RIP running under any Microsoft Windows operating system, the template `<jobname><dot>tif` produces the file name `TestPage Section 20-Book 9.tif`. The colon character (`:`) is

removed from the file name, because this is not a valid file name character for any version of Microsoft Windows.

`<jobname1>`

This tag ensures that only alphanumeric characters are used in the job name.

For example, in the RIP running under a Windows operating system, the template `<jobname1><dot>tif` produces the file name `TestPageSection20Book9.tif`. The colon and white space characters are removed from the file name, because they are not alphanumeric characters.

`<mac>`

The use of this tag verifies that the file name is suitable for use in a Macintosh operating system. Illegal characters such as an asterisk, colon, and quotation marks cause an error. The maximum length of a file name is thirty-one characters (including the file extension).

For example, using the template `<mac><28jobname><dot>tif` produces the file name `TestPage Section 20-Book 9`, in which the colon has been removed.

`<page#>`

You can use this tag to include the page number in the file name string.

For example, the template `<page#><dot>tif` produces a file name of the form `001.tif`. It is advisable to use this tag with the job number tag to differentiate between the same pages of different jobs.

`<prefix>`

You can use this tag to include the page number prefix from the page buffer name in the file name string.

For example, based on the page buffer name above, this tag produces the string `1.`

`<time>`

You can use this tag to include the time a file is processed in the file name string.

For example, if printing to file at 15:39:36 (approximately 3:39 pm) this tag produces the string `153936`.

`<unique>`

You can use this tag to generate a unique sequence number for the page. The default length of the number generated is four digits long, so the first number would be `0000`. The length of the number can be specified, as detailed in the example for the tag `<job#>`.

When restarting the RIP, the unique numbering will attempt to restart at its initial value, for example: `0000`. However, if a file exists with that number, the next available unique number is used.

`<unix>`

The use of this tag verifies that the file name is suitable for use in the UNIX operating system. Illegal characters such as an asterisk, colon, and quotation marks cause an error. The `<dot>` tag cannot be used with this tag because file names in UNIX are composed of a single string and are not considered to have separate file extensions.

For example, using the template `<unix><255jobname>.tif` produces the file name `TestPageSection20-Book9.tif`, in which the colon and white space characters have been removed.

`<win32>`

The use of this tag verifies that the file name is suitable for use in a Windows operating system. Illegal characters such as an asterisk, colon, or quotation marks cause an error.

For example, the template `<win32><jobname><dot>tif` produces the file name `TestPage Section 20-Book 9.tif`, in which the colon has been removed.

`<xres>`

You can use this tag to include the horizontal resolution of the page in the file name string.

For example, you can differentiate between pages with a resolution of 1440 x 720 dpi and 720 x 720 dpi by using this tag. This tag produces a string such as `1440` or `720`, depending on the horizontal resolution.

`<yres>`

You can use this tag to include the vertical resolution of the page in the file name string. For example, on a page with the resolution 1440 x 720, this tag produces the string `720`.

4.8.1.2 Conventional name generation

Selecting **Conventional** in the **File name generation** text box allows you use the previously employed method of generating file names.

In general, the RIP names each file within a folder uniquely by combining characters from some of the following character strings:

- The page number of the job.
- A stem—fixed or variable.
- The name of the separation.
- A sequentially increasing number.
- A suffix.

If the combined length of these character strings is sufficiently long, the RIP truncates the stem to stay within the maximum length of a file name on the computer running the RIP or an optional tighter limit providing greater portability between different types of computers.

To impose the limit for portability, select the box **Use 8.3 Filenames**. This specifies a maximum length of 8 character names with 3 character extensions: for example, `TIFF3001.tif`. This limit is necessary if you wish to move the TIFF files to a PC running some older versions of MS-DOS or Windows.

Specify the *suffix* of the file name (that is, the file extension) by typing a string into the **Suffix** text box. By convention, many applications expect the suffix of a TIFF file to be `.tif` or `.TIF`.

The *stem* of the name can be a fixed stem or a variable stem based on the jobname.

You can specify the *fixed stem* of the file name produced (that is, the first part of the file name) by typing it into the **Stem** text box. For example: `TIFF`.

The RIP creates a simple file name based on the stem, a sequentially increasing number, and the suffix. For example, for a stem of `TIFF` the sequence is: `TIFF00.tif`, `TIFF01.tif`, `TIFF02.tif`, and so on. If any of these files already exists, the RIP creates the lowest numbered file that does not clash and increases the numbers from that starting point, avoiding any other existing files.

Alternatively, the RIP can use the job name itself as the *variable stem* of the file name if you select **Use jobname as stem**. The job name is truncated if necessary to keep within the allowed length of file name.

In this case, the RIP creates a file name based on the page number of the job, the job name, the color of the separation, a number, and the suffix. For example, when separating a color job called `jobname.ps`, you might see: `1jobnamepsC00.tif`, `1jobnamepsM00.tif`, `1jobnamepsY00.tif`, `1jobnamepsK00.tif`, `2jobnamepsC00.tif`, `2jobnamepsM00.tif`, `2jobnamepsY00.tif`, `2jobnamepsK00.tif`.

If a file already exists, the RIP creates the next file in the sequence.

If you do not want the page numbers to appear at the start of the file name, select the **Del page num prefix** check box. In this case, the RIP creates file names such as `jobnamepsC01.tif`. This option is only relevant if you select **Use jobname as stem**.

The **Use jobname unchanged** option is designed to support jobs arriving with names that include double-byte characters, as used in several Oriental languages and other extended alphabets. Previously, the output file name was constructed after testing characters byte by byte, and discarding characters that were potentially illegal in file names. This is still the safe, and strongly recommended option, but when there are illegal characters it can produce files with unpredictable names, which may be difficult to use in complex workflows.

To retain the previous behavior, leave the check box **Use jobname unchanged** unselected.

To enable the new option, select the check box **Use jobname unchanged**. (For this option to work, you must also select **Use jobname as stem**.) The result is that each TIFF file has a predictable name but that name may be illegal because of length or characters used in the name. It is very dangerous to use

this option where the form of incoming job names is not known before submission to the RIP.

To recap, the full path and name of a TIFF file can be as complex as the following example:

McBit:RIP:TIFF_Folder/300/1jobnamepsM00.tif

In this example, 300 is the resolution of the TIFF file. The preceding text is the path to the selected folder and the following text is the file name.

The **Unique Filenames** option ensures that a ## number is added to the filename, and is selected as a default (providing the same behaviour as previous versions of TIFF output). If the **Unique Filenames** option is not selected, the filename does not have the unique ## number added to it.

Shown below are examples of template-based file name generation that give similar (but not necessarily identical) results to the conventional name generation method.

These examples are based on the assumption that the conventional name generation fields “stem” and “suffix” are set to TIFF and TIF respectively.

The template-based method uses a fixed-length uniqueness field. The template-based method will always fail to generate a unique name when files exist in the output folder using every possible number (whereas the conventional method increases the number of digits in the uniqueness number).

Template-based and Conventional name generation comparison.

Table 4.1

Conventional options	Template-based equivalent
Use jobname as stem (on its own)	<prefix><jobname1>.TIF or <prefixonly><jobname1>.TIF **Note**: The first example is not identical because <prefix> includes a space. The second example is available from 3.10r4.
Use jobname as stem **Del page num prefix**	<jobname1>.TIF

Table 4.1

Conventional options	Template-based equivalent
Del page num prefix (on its own)	`TIFF.TIF` See Note 1.
Use 8.3 filenames (on its own)	`TIFF.TIF` See Note 1.
Use jobname unchanged (on its own)	`TIFF.TIF` See Note 1.
Use jobname as stem **Use jobname unchanged**	`<prefix><jobname>.TIF` **Note**: Not identical—the template method strips characters which are not allowed in file names on the relevant platform, such as colon and slash (all platforms).

Use jobname as stem
Unique names
	`<prefix><jobname1><2unique>.TIF`
	or
	`<prefixonly><jobname1><2unique>.TIF`
	Note: The first example is not identical because `<prefix>` includes a space.
	The second example is available from v3.10r4.

Use jobname as stem **Use 8.3 filenames** **Unique names**	`<dos><prefix><3jobname1><2unique><dot>TIF`
Use jobname as stem **Use 8.3 filenames** **Use jobname unchanged** **Unique names**	`<dos><prefix><3jobname><2unique><dot>TIF` Not identical. See Note 2 and 3.
Use jobname as stem **Del page num prefix** **Use 8.3 filenames**	`<dos><6jobname1><2unique><dot>TIF` See Note 2.

Table 4.1

Conventional options	Template-based equivalent
Use jobname as stem	`<dos><6jobname><2unique><dot>TIF`
Del page num prefix	See Note 2.
Use 8.3 filenames	
Use jobname unchanged	
Unique names	

Notes on the table:

1. These Conventional name generation options always generate the name `TIFF.TIF`.
2. `<dos>` does not shorten names (which the conventional method's option does), so the tags used to make up the stem need to total eight. To allow for more characters in the prefix, the jobname would need to use less. You must use `<dot>` to separate the name and the extension when using `<dos>`.
3. Because `<dos>` strips space and full-stop characters, `<prefix>` and `<prefixonly>` become equivalent when `<dos>` is used.

4.8.2 TIFF file format options

All the remaining options in the dialog, with the exception of **Anti-Aliasing**, provide different ways of storing the data in the file but do not affect the viewed image. These different ways of storing the data may be required by the specific application that will read the TIFF files or may improve the portability or speed of access of the files.

You can choose the basic internal format used for the file from the **Format** pop-up menu. TIFF files can either contain the image data in a `Single strip` (all in one chunk) or `Multiple strips` (several chunks).

Use the **Style** pop-up menu in the Edit Page Setup dialog box to choose the color space and interleaving style.

To produce TIFF files with reverse bit ordering, select the **Reverse bit ordering** check box. This reverses the order of bits in a byte in the raster data of a half-

toned TIFF file (monochrome), so if the byte was 11010001 it becomes 10001011.

Select the **Pad to 32 bit alignment** box to make each line of the TIFF file data end on a multiple of 32 bits. This is an efficiency setting, for monochrome output only, that may make the file faster to read in some applications.

You can choose between Macintosh and IBM PC byte ordering from the **Byte ordering** pop-up menu. This option lets you select the byte ordering to be that used by Intel (IBM PC) machines (little endian machines), or Motorola (Macintosh) machines (big endian machines). This is the order of bytes in a word, needed by the TIFF reader to correctly interpret the TIFF header. Most TIFF readers can read both sorts of header.

You can choose the compression format used for the file from the **Compression** pop-up menu. The choices are: `None`, `CCITT Huffman`, `CCITT Group 3`, `CCITT Group 4`, `LZW`, or `Packbits`.

Note: The CCITT compression formats are only suitable for monochrome output.

Finally, for all except monochrome files, you can choose a level of anti-aliasing in which intermediate colors are used to visually smooth boundaries. (Anti-aliasing is most useful at low or medium resolutions.) Select the desired option from the **Anti-Aliasing** pop-up menu. `None` is the fastest option but provides no anti-aliasing. Of the other options, the higher numbers provide more smoothing, but also require more time to prepare a given image.

Note: If you output any job to TIFF CMYK Composite (Pixel) with anti-aliasing set at `8x8`, the following error will appear for the TIFF device if the resolution is greater than 300 dpi:

```
%%[Warning: band size too small - please increase size]%%
```

To overcome this problem, you should increase the value in the **Band size for printing buffer** option. For more information see Section 6.3.4 on page 260.

4.8.3 TIFF file post processing

You can use this section of the dialog box to define extra actions after the RIP has created each TIFF file.

To do this, you type text specifying a command and its options in a way similar to typing in a command prompt or terminal window. The command can be a simple batch file or a complex application, provided that you can give the command all necessary options and information on the command line; a command needing operator interaction is likely to cause problems.

You can use such post-processing commands to convert the file to a different format or to send the data to a destination that is not directly supported by TIFF output from the RIP. There are several other possibilities, such as extracting information for use in reports, limited only by your ability to obtain or create a suitable application and to supply information to it.

The controls in this section of the dialog box are:

Enable Select this check box to enable a post-processing command, as entered in the **Command** text field. Leave it unselected to disable post-processing.

Create Window Check this box to display a command prompt window: for example, to display any messages produced by the post-processing command. The command window closes at the end of the command so, to read any messages, you may need a timed delay before the command finishes. (A wait for a key-press may be useful for testing but becomes unworkable with many output files.)

Command The entry in this text field is a string specifying a post-processing application, which must be available on the computer running the RIP. Optionally, you can supply options understood by the application, and data such as the name of the relevant input or output files. The command string can contain substitution codes. The RIP expands the codes and runs the command at the end of each output file.

Section 4.8.3.1 lists the recognized substitution codes.

The string should normally include the file extension and the full path name of the application file. However, you can type just the file name if the command file has extension `.EXE` and is in one of the folders specified by the `PATH` variable. File names passed to the application as data are assumed to be in the folder receiving the TIFF files, unless you type a different path name.

4.8.3.1 Post processing substitution codes

The Harlequin RIP recognizes the substitution codes shown in Table 4.2. You can insert an integer between the percent character and the letter code, to

restrict the maximum number of characters used in the result string. For example:`%6j` represents the first six characters of the job name.

Table 4.2 Post processing substitution codes

Code	Meaning
%c	The current separation color, represented by a string of default length one character. Typical separation names are `Cyan`, `Magenta`, `Yellow`, and `Black`. Examples for length one are: `C`, `Y`, `M`, and `B`.
%d	The current date. In the case of the TIFF plugin, this defaults to a length of 6 digits (`YYMMDD`). For example: 26 October 1998 becomes `981026`. `%8d` gives `YYYYMMDD`.
%e	The job exposure, as entered in the Page Setup dialog box. For example: `221`.
%f	The output TIFF file name, not including the full path. For example, based on jobname and not suppressing the page number: `1ColdfacepsC05.TIF`.
%g	A fixed jobname using the following rules: 1. Skip over the leading `nn.`.which the RIP pre-pends. 2. Remove all non-alphanumeric characters.
%j	The current page buffer name, as shown in the Output Controller/Monitor. For example: `1. Coldface.ps (C)`.
%n	The current job number, an integer that the Harlequin RIP increments each time it processes a new job. For example: `115`.
%o	The full output directory path set by the **Folder** button (but not the resolution, if the check box to include resolution has been checked; nor the file name). For example: `C:\S\TIFF\`.
%p	The current page number within the job. For example: `13`.
%r	The job resolution, in dots per inch. For example: `72`.

Table 4.2 Post processing substitution codes

Code	Meaning
%s	The current job name, after removal of characters that would be illegal in a file name. For example: `Coldfaceps`. %s uses the following rules: 1. Skip over the leading `nn.` which the RIP pre-pends. 2. Remove all parenthetical expressions. 3. Remove everthing which comes before delimiter characters - `:` (colon), `;` (semi-colon), @ (commercail at), - (hyphen), and control characters. Delimiters within parentheses do not count. 4. Remove all non-alphanumeric characters. 5. If rules 1-4 result in an empty name, start over again and just use rule 4.
%t	The current time in the format HHMMSS, using the 24 hour clock. The default length is 6. For example, a time just after 7:30 pm would be shown: `193211`.
%x	The current file name suffix. For example: `TIF`.
%z	The output file name stem, is taken from the job name if **Use jobname as stem** is selected, otherwise it will be taken from the **Stem** text field. For example: if **Stem** is set to `TIFF`, and **Use jobname as stem** is not selected; %z will produce `TIFF00`, `TIFF01`, and so on for the output files `TIFF00.tif`, `TIFF01.tif` and so on.

4.9 Sending output to a printer

You can use the Harlequin RIP to produce output on a variety of different imagesetters and printers. The options available depend on the device drivers that have been installed with your copy of the RIP.

If any device drivers have been installed, you can select one of these drivers in the Edit Page Setup dialog box from the **Device** pop-up menu. Selecting `Ultre`, `PelBox`, or `HP650`, for example, sends output to the corresponding printer, provided that somebody has done any necessary configuration to suit the way that the printer is connected and configured.

You can gain the ability to send output to many other types of device by adding other *output plugins*. A simple plugin may add a single *device driver*, and this manual usually talks about the device that the driver supports. Complex output plugins can support several device drivers and provide preconfigured page setups, screening, or color management. Such complex plugins can require several steps during installation: hardware installation, system software modifications, software installation in the Harlequin RIP, and enabling specific devices or RIP options with passwords. There is likely to be a separate installation or operator's manual for such plugins and, perhaps, a special installation program.

Note: It is often dangerous to attempt to re-install or update an installed plugin in the same copy of the Harlequin RIP, because of file name mapping (described briefly on page 83) and other issues. It is much safer to make a fresh installation of the RIP, install the new plugin, and then transfer your setting to the fresh installation. The separate Migrate program can help you make this transfer.

Where a plugin supplies a single device type, the device type becomes ready for use as soon as it has been installed and, if necessary, enabled with a password. Multiple device output plugins appear first as one of the options in the Device Manager, where you can choose which device you want to use. See Section 4.11 on page 155.

Once installed, the name of a device added with a new output plugin appears as one of the device options in the Edit Page Setup dialog box and you can select it just like any other device.

Under **Separations, Screening & Color**, the **Style** pop-up menu contains all the separations styles created for the current device. The choice of separations style determines the color space and format of the output.

Note: Some output plugins allow you to select the color generation mode using the **Configure Device** button. When this is the case, the **Style** pop-up menu contains only the separations styles corresponding to the selected color generation mode.

For certain types of output device, a text box labeled **Exposure** becomes active in Edit Page Setup. By specifying a number in the text box, you can change the exposure of the chosen output device: this varies the power of the laser used

to create the image, which in turn makes the image lighter or darker. Refer to the documentation for your output device to see if it has an exposure control. Choosing the correct exposure is described in Chapter 10, "Calibration".

Media and cassette monitoring and management facilities are available for all continuous feed printers supported by the Harlequin RIP. For details of how to use these facilities, see Chapter 8, "Media Management", and "Cassette management" on page 194.

4.10 ProofReady plugins

ProofReady plugins allow the RIP to provide page images to a supported printer and work in a different way to other plugins.

When you create a Page setup for a ProofReady device a default color setup is applied, using input and output profiles, and rendering intents defined within the plugin. You must have ColorPro enabled to use this automatic color management feature. You can also create your own color setup if you do not wish to use the default settings.

ProofReady plugins have the following capabilities:

- Instant color management using supplied profiles
- A choice of resolution for the output page image for all media sizes and types supported by the model of printer in use
- User choice of output quality
- Availability of Harlequin screening techniques
- Preview of the screened output

Using the ProofReady plugin is straightforward. You select the required device, configure it, select a profile from the **ProofReady** menu and then print.

If you would like to improve color accuracy and you have a measurement device available, you can print an uncalibrated target, measure it with Genlin and then import the data and make a new calibration set.

You then go back to the Page Setup and select this calibration with the ProofReady Setup unchanged and proof using the calibration and the ProofReady setup combined.

4.10.1 Using ProofReady plugins

Each ProofReady plugin is supplied ready to use with preconfigured color management for several types of media.

With a ProofReady plugin, the way that you apply color management is simpler than with ColorPro because the setups are ready to use. The special color setups appear in the **ProofReady** menu in the **Output Device** section of the Page Setup dialog box, each named for a particular combination of media and resolution. Choosing one of the entries from the **ProofReady** menu, gives you a default color setup that produces good results for most jobs.

When an option is selected from the **ProofReady** menu, the options in the **Separations, Screening and Color** section of the Page Setup dialog are enabled. This allows you to create and edit ProofReady color setups or separation styles. However, non-compatible separation styles and color setups cannot be selected or created.

If you want to create a calibration set for your printer rather than using the reference calibration profile, you can print an uncalibrated target and import the data using Genlin. Once you have created a calibration set, you must choose it from the **Calibration** menu.

You can also expand the capabilities of a ProofReady plugin, by creating and using custom color setups built upon the same profiles used to create the default color setups.

For more details of ProofReady plugins, see the user guide for the relevant ProofReady plugin.

4.11 Multiple device output plugins

The Harlequin RIP lets you install *multiple device output plugins*, which allow you to drive a number of different devices without needing a separate output plugin for each one.

Note: Many output plugins intended for use with a range of similar output devices, such as inkjet printers, are multiple output plugins but are supplied with preconfigured devices ready for use in the Edit Page Setup dialog box. You should only need to use the description given here if the installation procedure for a plugin fails to install a device of the type you want.

This discussion uses the following terms:

Device	A device is often a physical piece of equipment which produces output. It can also be a way of producing a graphics file in a format like TIFF. A device can be selected by name from the **Device** pop-up menu in the Edit Page Setup dialog box.
Device type	Any particular device is of a certain type. For instance, some printers are of type Ultre, and some are of type ExxtraSetter. Distinguishing different device types is like distinguishing different models of computer. Some options (for example, the resolutions or media types available) depend on the device type.
Output plugin	The output plugin is the software you install into the RIP to make it drive a particular device. It tells the RIP the name and type of the devices it drives, as well as the address of the device (that is, where to find the device—in terms of the computer rather than physical location).

With ordinary output plugins, one plugin can drive only one device. If you want to install a large number of devices, you need many different output plugins. This can make configuration of the system cumbersome.

Multiple device output plugins allow you to drive a number of different devices using just one plugin. You can have any number of devices of a particular type.

Figure 4.9 shows you the configuration of an imaginary system using both single and multiple device drivers.

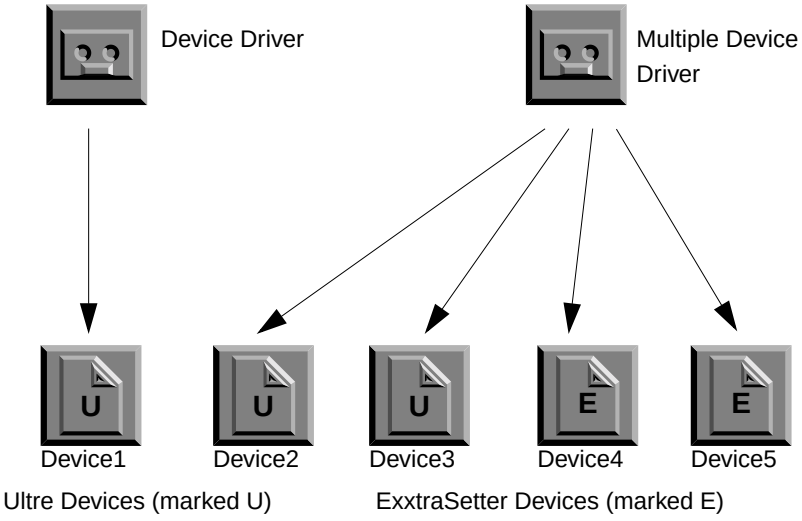


Figure 4.9 The use of multiple device drivers in the Harlequin RIP

Five devices are shown, driven by two output plugins. `Device1` is of type `Ultre`, and is driven by an ordinary output plugin.

However, the remaining four devices are all driven by one multiple device output plugin. Two of these devices are of type `Ultre`, and two are of type `ExxtraSetter`, so this driver must know about at least two device types—it may well know about others.

4.11.1 Installing and using multiple device plugins

Install a multiple device output plugin, just as you would for an ordinary output plugin and as described in Section 4.9 on page 152. The plugin then appears as one of the options in the Device Manager dialog box, shown in Figure 4.10.

You create and configure devices driven from a multiple device driver using the Device Manager. To open the Device Manager click the **Device Manager**

button, which is the icon button under **Output Device** in Edit Page Setup. The Device Manager is also available from the **Harlequin RIP** menu.

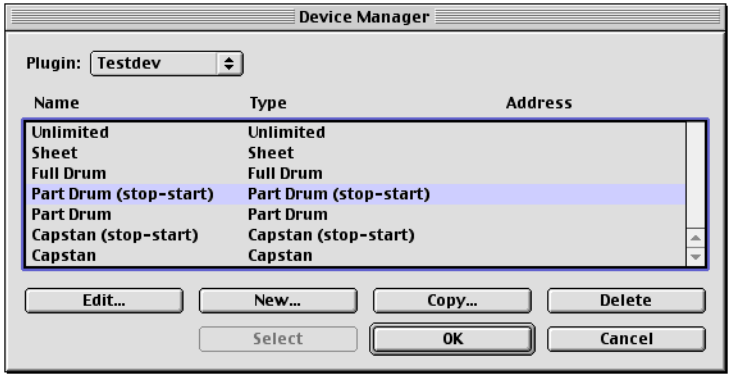


Figure 4.10 Device Manager dialog box

The **Plugin** pop-up menu shows the multiple device output plugins currently installed in the RIP. You can install several multiple device plugins, and this pop-up menu lets you choose between them. The devices driven by the selected plugin appear in the table listing: each line displays the name, type, and address of one device.

For instance, in Figure 4.10 the dialog box lists devices linked to the `MultiDev` multiple device plugin.

Note: Both the name `MultiDev` and the values entered for each device are fictitious and used here for illustration only. There are several multiple device plugins but their names and the acceptable values vary greatly, so they are documented separately. A typical real multiple device plugin is `GPVI`.

The Device Manager has the following uses:

- To change the configuration of a device, select its entry in the list and click **Edit** then use the Device Manager Edit dialog box.
- To add a new device, click **New** then use the Device Manager Edit dialog box.
- To add a device that is similar to an existing device, select its entry in the list and click **Copy** then use the Device Manager Edit dialog box. You must give the copy a new name.

- To delete a device from the current multiple device driver, select it in the Device Manager and click **Delete**. This removes the driver immediately.

When you click the **New**, **Edit**, or **Copy** button, the RIP displays the Device Manager Edit dialog box shown in Figure 4.11.

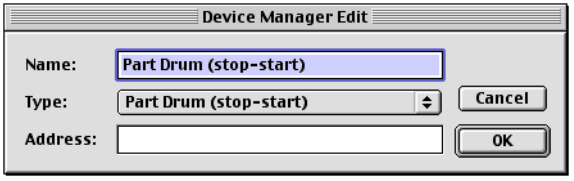


Figure 4.11 Device Manager Edit dialog box

This dialog box has three fields that you can edit:

- Specify a name for the device in the **Name** text box. This is the name that appears in the **Device** pop-up menu in the Edit Page Setup dialog box, and elsewhere.
- Choose the device type from the **Type** pop-up menu—a list of all the device types that the selected multiple device output plugin supports. The device types are preset during the manufacture of a plugin and are not subsequently configurable. You cannot tell a multiple device driver to look for a device with a type not listed here.
- Use the **Address** text box to type in the address of the device you are adding or editing. This text box provides device information such as a multiplex address, a SCSI port, or a file name; all highly dependent on the type of device. For details of what to enter here, refer to the documentation (available from your supplier) for the specific multiple device output plugin.

Click **OK** when all values in the Device Manager Edit dialog box are as you want them. This confirmation is provisional: you must also click **OK** in the Device Manager to finally save your changes. If you opened the Device Manager from the Edit Page Setup dialog box, you can also save the changes by clicking the **Select** button. In addition to saving the changes, the **Select** button displays the selected device in the Edit Page Setup dialog box. Click **Cancel** to discard all changes.

4.12 Output plugin dialog boxes

Many devices have features which only apply to that device. For example, a certain printer may be able to print on both sides of the paper, a feature called *duplexing*. Such features may be controllable, in which case the device driver offers a dialog box unique to that driver containing, for example, a check box to turn duplexing on or off. For example, the device `TIFF` can have its output file name and format configured (as shown in Figure 4.8, page 135). If the driver does not have any configurable options, the **Configure Device** button is disabled.

Some output plugins allow you to set the color generation mode using the **Configure Device** button. In these cases, the **Style** pop-up menu contains only the separations styles corresponding to the selected color generation mode. Otherwise, the choice of separations style determines the color space and format of the output.

4.13 Separations, Screening and Color

The options under **Separations, Screening & Color** allow you to choose the separations style and color setup for the current page setup.

Style

The **Style** pop-up menu allows you to choose a separations style for the currently selected device. A separations style contains information on separations and screening (where appropriate), which you can use in one or more page setups. The choice of separations style determines the color space and format of the output.

Note: Some output plugins allow you to set the color generation mode using the **Configure Device** button. In this case, the **Style** pop-up menu contains only the separations styles corresponding to the selected color generation mode.

If you change the **Device**, you may have to select a corresponding separations style for the new device before you can save the page setup.

Click the **Separations Manager** button to create or edit a separations style.

Separations Manager

This icon button is next to the **Style** pop-up menu. It opens the Separations Manager dialog box, from which you can create or edit a separations style. See Chapter 11, "Color Separation" for details.

The Separations Manager is independent of the Edit Page Setup dialog box. You can create or edit a style in the Separations Manager, even if you do not want to use it in the current page setup. If you do want to use a new or changed style for this page setup, select the style in the Separations Manager and click the **Select** button.

Color

The **Color** pop-up menu allows you to choose a color setup for the currently selected device and color space. The choice of separations style determines the color space. Click the **Color Setup Manager** button to create or edit a color setup. See Section 11.8 on page 450 or the separate manual *Harlequin ColorPro User's Guide.*

Color Setup Manager

This icon button is next to the **Color** pop-up menu.It opens the Color Setup Manager dialog box, from which you can create or edit a color setup. See the separate manual *Harlequin ColorPro User's Guide.*

Separations Manager

This icon button is next to the **Style** pop-up menu. It opens the Separations Manager dialog box, from which you can create or edit a separations style. See Chapter 11, "Color Separation" for details.

The Separations Manager is independent of the Edit Page Setup dialog box. You can create or edit a style in the Separations Manager, even if you do not want to

use it in the current page setup. If you do want to use a new or changed style for this page setup, select the style in the Separations Manager and click the **Select** button.

TrapPro Manager

The TraPro Manager is independent of the Edit Page Setup dialog box, and is only available if TrapPro or TrapPro Lite are enabled under **Configure RIP > Extras**. You can create or edit a trapping setups in the TrapPro Manager, even if you do not want to use them in the current page setup. If you do want to use a new or changed trapping setup, select the trapping setup in the TraPro Manager and click the **Select** button.

For more inf0ormation see Section 11.10 on page 464.

4.14 Media saving option

Media saving is provided as an extra layered option that allows you to instruct the Harlequin RIP to automatically fit pages onto the output media in a way that makes the most efficient use of the media. For example, when imaging A4 pages they would normally be placed one above the other on the output media. With media saving enabled, the A4 pages could be placed side-by-side thus utilizing more of the media width.

This option is especially useful with Capstan and Drum devices. For more information on how to select the extra features supplied with the RIP see Section 6.8, “Extras”.

Media saving is enabled for each page setup by clicking the **Media Saving** option situated in the lower left section of the Edit Page Setup dialog box.

With the media saving option selected, jobs processed in the RIP are automatically grouped together with other jobs according to resolution, bit depth, paper type and output device. The jobs are only output to the device when the page is full. A collection of jobs on a page is known as a ‘flat’.

For example, you may have a 32 inch roll installed in the output device and a queue of three A4 sized jobs waiting to be output. Instead of printing a single

job along the width of the roll, the RIP will fit all three jobs along the width of the roll—ultimately saving media.

The Media saver works by receiving page buffers from the RIP. In the page-buffer header there are fields specifying the media width and media height, page width and page height. The Media saver uses the media width and media height values as the size of the flat and page width and page height value as the size of the page.

If the device supports cassettes, the media width and media height values are defined in the Cassette manager. If the device is a roll, media height in the page buffer is the same as the page height and is ignored by the media saver.

If the device does not support cassettes, the media width and media height values are those entered by the user in the Page Layout dialog box. Again the roll device rule applies.

Note: A Watermark RIP cannot currently be used in conjunction with the media saving option. For this reason, the Media Saving check box in the Page Setup dialog box is disabled when using a Watermark RIP.

4.14.1 Tracking media width for automatic cassette selection

From Harlequin RIP Eclipse Release SP3, the width of media used is tracked to aid the use of automatic cassette selectors.

For roll fed devices, the length of the media that needs to be exposed when outputting a flat has always been tracked, with the assumption that the width value is constant. However, because automatic cassette selection devices are starting to be used, it is now important for the RIP to track the width of the media used in addition to the length.

If the width of the flat is reduced, a cassette with smaller width media can be selected leading to a shorter exposure time and saving of media.

When enabled, the RIP **Output** menu contains the **Media Saving** option, which on selection displays the Media Saving dialog.

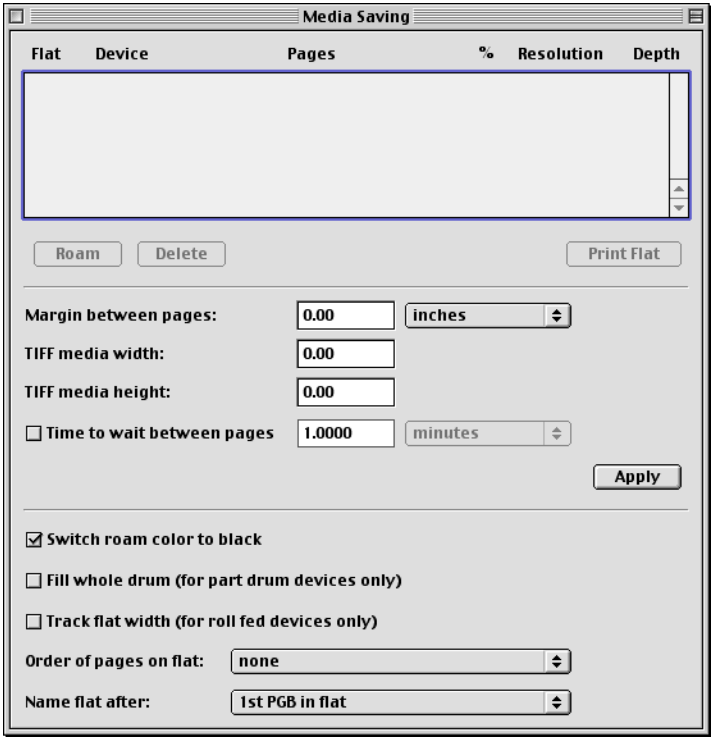


Figure 4.12 Media Saving dialog box

4.14.2 The Media Saving dialog box

The Media Saving dialog box displays all the information required for you to keep track of which jobs are being combined into flats. Jobs will only be added to a flat if the resolution, bit depth, paper type and device are all the same—if any of these are different a new flat will be created.

As soon as a flat is full it will be output to the device. A flat is deemed ‘full’ when it reaches that stage where any new page of the same specification will not fit in the flat.

You can send a flat to the output device before it is completed by highlighting the flat to be output followed by clicking the **Print Flat** button.

You can ensure enough space is placed around each job by specifying a value in the **Margin between pages** option. The Media saver ensures that there is the same given margin between the edges of the paper and the pages of jobs—it achieves this by absolute positioning of the pages on the flat. Shown below is a diagram illustrating how pages are position on the flat.

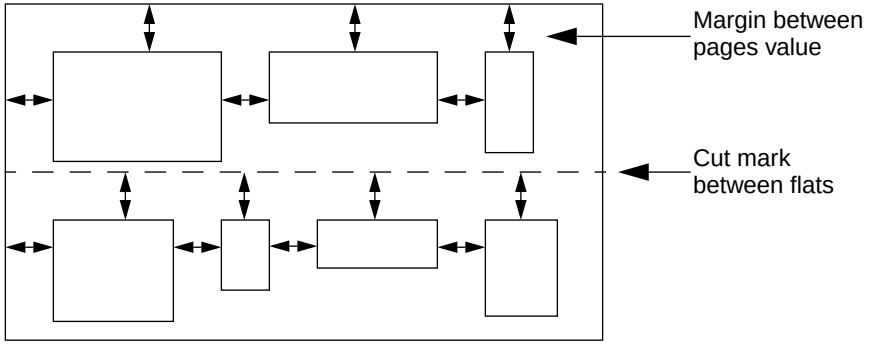


Figure 4.13 Margin media saving control

Note: If when using media saving you get output that is clipped, you should make the **Margin between jobs** value greater than the value of the unprintable margin for the device.

For a TIFF output device (or any other device with and unlimited media width and height) the media width and height end up being the same as the Page Size, and the size of a TIFF flat would be the same as the first page buffer on the flat.

From Eclipse Release SP4 **TIFF media width** and **TIFF media height** text boxes are added to the Media saving dialog. These options are designed for use with the TIFF output device (and any other device with unlimited width and height). The values in these fields are used to calculate the size of the TIFF flat.

If you want to avoid the possibility of a flat never being output, because there may never be enough page buffers of the same type, you can click the **Time to wait between pages** option and enter either a number of minutes or hours. When an incomplete flat has been displayed in the Media Saving dialog box for the defined time out period, it will automatically be output to the selected

device. When **Time to wait between pages** is not checked, partially filled flats will always wait for new pages of the same specification to arrive.

You can Roam individual pages displayed in the Media Saving dialog by selecting them and clicking the **Roam** button. Similarly, you can delete individual pages by selecting them and clicking the **Delete** button.

When a flat is printed, the page buffers that the flat references are deleted from the disk. Because of this, the **Print Flat** button is disabled when a Roam window is open.

If a flat is going to be printed because the time out period has expired and a Roam window is open, the flat is placed in a queue and is printed as soon as all Roam windows are closed.

By default, if the device is roll fed (for example part drum or capstan), the buffered pages are placed on the flat in one row along the width of the media. The height of the flat is ultimately that of the tallest page placed on the flat, and the width of the flat is as specified in the Page Layout dialog.

From Harlequin Eclipse Release SP4 this default behavior can be changed in two ways.

- For part drum devices, the **Fill whole drum (for part drum devices only)** check box controls the behavior that defines the media height as that of the device width, allowing multiple rows of page buffers on the flat, and as such allowing the whole of the drum to be utilized.
- For part drum and capstan devices (that is, roll fed devices), the **Track flat width (for roll fed devices only)** check box controls the width of the flat. If it is checked, the flat width will be the width of the widest row of pages on the flat.

You may encounter problems when you are outputting to a device that specifies a minimum media width. If a flat is submitted which defines a media width that is smaller than the device's minimum media width, the plugin will reject the flat and display the message:

```
"Error - The media width is less than the minimum allowed" - and the
job is aborted.
```

Also note, that if you are outputting separations and the flat size is being tracked (either width or height), it can occur that the separations will have different sizes. You are therefore unable to Roam these separations together.

From the Eclipse Release SP3 an option to **Switch roam color to black** is added to the Media Saving dialog. This is only enabled when the **Order of pages on flat** option is set to none, that is, when more than one separation color is allowed on the same flat. When selected, the Roam color of the resulting flat is black. This option does not apply to composite output.

Note: You are able to change the Roam Color from the Throughput Info dialog. See Section 5.3.2.10 on page 35 for more information.

From version 5.5r1 an extra media saving option is provided called **Order of pages on flat**. The **Order of pages on flat** option provides a drop-down list with the following options:

`none` Page buffers are placed on flats if they fit, regardless of color in the same way media saving worked in version 5.5 of the Harlequin RIP.

`by separation`
Each flat is dedicated to a particular separation name, therefore page buffers with different separation names cannot appear on the same flat. For example, cyan separations can only appear on cyan flats. However, once allocated to its flat, a page buffer may be positioned anywhere on that flat.

`by separation, page position`
Each flat is dedicated to a particular separation name, in the same way as described in the `by separation` option above. The page buffers for a given job must all be at the same position on their respective flats. But no consideration is given to what other separations may be on these flats. Therefore, it is not guaranteed that the group of flats that contains all the page buffers for any one job also contains all the page buffers for the other separations on the flat.

Note: This option will not work for preseparated jobs, because the RIP treats each separation as a different job.

`by separation, page position, job`

Each flat is dedicated to a particular separation name. The page buffers for a given page must all be at the same position on their respective flats. It is additionally guaranteed that the group of flats that contains all the page buffers for any one job also contains all the page buffers for the other pages on the flat. Empty spaces will be left for separations that are not available or missing.

Note: This option will not work for preseparated jobs, because the RIP treats each separation as a different job.

From the Eclipse Release SP3 a **Name flat after** option is provided in the Media Saving dialog which controls the job name of the flat. The default setting is to name the flat after the `1st PGB in flat` which is how it always has worked. That is, the flat is named after the first job placed on the flat. The alternative option is to name the flat after the `flat number`. With this option the job name uses the flat number as it appears in the dialog, so “Flat 1” will have the job name; `1. Flat 1`. Subsequent new flats will be named incrementally. When the RIP is stopped and started the name of the first flat will be; `1. Flat 1` unless an existing flat is detected in the media saving, in which case any new flats will be named incrementally from the name of the detected flat.

Note: If you decide to change this option midway through a RIP session, any previously created flats will not be renamed, that is the change will only affect any subsequent flats that arrive.

The following examples illustrate the differences between the `by separation, page position` and `by separation, page position, job` options.

Table 4.3 Media saving—example 1

Incoming Job	by separation, page position		by separation, page position, job		Flat No.
	position 1	position 2	position 1	position 2	

Table 4.3 Media saving—example 1

Incoming Job	by separation, page position		by separation, page position, job		Flat No.
—, —, —, K_1	K_1	K_4	K_1	—	Flat 1
C_2, M_2, Y_2, —	C_2	C_4	C_2	—	Flat 2
—, M_3, Y_3, —	M_2	M_3	M_2	M_3	Flat 3
C_4, —, Y_4, K_4	Y_2	Y_3	Y_2	Y_3	Flat 4
	—	Y_4	C_4	—	Flat 5
	—	—	Y_4	—	Flat 6
	—	—	K_4	—	Flat 7

Table 4.3 shows an example where four incoming jobs are placed on flats differently according to the selection of either; `by separation, page position` or `by separation, page position, job`.

With `by separation, page position` selected, the first incoming job contains only a black separation (K_1) which is placed on the first flat in position 1. The second job (C_2, M_2, Y_2) contains no black separation and therefore creates three new flats (2, 3, and 4). The third job contains only magenta and yellow separations (M_3, Y_3).There is space on existing flats for this job, magenta flat 3, position 2 and also yellow flat 4, position 2. The fourth job contains cyan, yellow and black separations, (C_4, Y_4, K_4). There is space on black flat 1, position 2 for K_4, and also space on cyan flat 2, position 2 for C_4. However, yellow flat 4 already contains a separation, therefore a new flat (5) is created and the yellow separation is placed in position 2.

It can be seen from this that each flat contains separations in no particular order. A single job can appear on earlier or later flats as long as there is space.

With `by separation, page position, job` selected, the first three incoming jobs are treated as before. The black separation in the first job (K_1) is placed on the first flat in position 1. The second job (C_2, M_2, Y_2) creates three new flats (2, 3, and 4). And the third job (M_3, Y_3) finds space on existing flats on, magenta flat 3, position 2 and also yellow flat 4, position 2.

The fourth job contains cyan, yellow and black separations, (C_4, Y_4, K_4). Even though there is space on black flat 1, position 2 for K_4, there is no corresponding space in position 2 of flat 3 and flat 4 for the magenta and yellow plates. This is because this option keeps the separations for each job together. Therefore, new flats 5, 6 and 7 are created o accommodate (in position 1) the cyan, yellow and black separations from incoming job 4.

This illustrates that using this option, jobs stay together and appear on consecutive flats.

Table 4.4 Media saving—example 2

Incoming Job	by separation, page position		by separation, page position, job		Flat No.
	position 1	position 2	position 1	position 2	
C_1, M_1, —, —	C_1	C_3	C_1	—	Flat 1
—, M_2, Y_2, —	M_1	M_2	M_1	M_2	Flat 2
C_3, M_3, Y_3, —	—	Y_2	—	Y_2	Flat 3
	—	M_3	C_3	—	Flat 4
	—	Y_3	M_3	—	Flat 5
	—	—	Y_3	—	Flat 6

Table 4.4 shows an example where three incoming jobs are placed on flats differently according to the selection of either; `by separation, page position` or `by separation, page position, job`.

With `by separation, page position` selected, the first incoming job contains a cyan and magenta separation (C_1, M_1) which are placed on flat 1 and 2, position 1. The second job, (M_2, Y_2) can use the second position in flat 2 for the magenta and creates a new flat (3) for the yellow. The third job contains cyan, magenta and yellow separations (C_3, M_3, Y_3).There is space on flat 1 for the cyan separation, but no space on flats 2 and 3, position 2 for the magenta and yellow. (The yellow cannot go onto flat 3, position 1 because it would not be in the correct position for registration). Therefore, new flats (4 and 5) are used and the cyan and magenta separations are placed into position 2.

Again, each flat can contain separations in no particular order. A single job can appear on earlier or later flats as long as there is space.

With `by separation, page position, job` selected, the first two jobs behave as before. The first incoming job contains a cyan and magenta separation (C_1, M_1) which are placed on flat 1 and 2, position 1. The second job, (M_2, Y_2) can use the second position in flat 2 for the magenta and creates a new flat (3) for the yellow.

The third job contains cyan, magenta and yellow separations (C_3, M_3, Y_3).There is space on flat 1 for the cyan separation, on flat 1, position 2 but it is not used because the next flats do not have space. Therefore, new flats (4, 5 and 6) are created and the cyan, magenta and yellow separations are placed into position 1 on those flats.

This illustrates that using this option, jobs stay together and appear on consecutive flats.

4.14.3 Media Saving dialog box example

The following example of the Media saving dialog box shows a number of flats in various stages of construction:

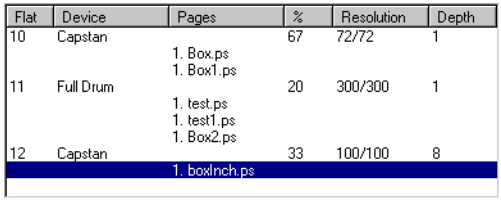


Figure 4.14 Example flats

In this example there are three flats in construction: `Flat 10` is destined to be output on a Capstan device and has two jobs called `Box.ps` and `Box1.ps` using 67% of the flat. `Flat 11` is destined for output on a Drum device and has three jobs using 20% of the flat. `Flat 12` is also destined for output on a Capstan device but at a different resolution to `Flat 10`.

4.15 Media and time saving using optimization

The Harlequin RIP provides media and time saving options in the **Optimization** pop-up menu in the Processing section of the Page setup dialog box. These options are only available if your output device supports them. If your output device does not support these features, the options will not appear in the list.

The media saving described in this section is different to the Media saving option described under Section 4.14 and does a different job. Using the two options together may give unpredictable results.

The **Optimization** pop-up menu allows you to instruct the RIP to rotate pages automatically if doing so saves time or media. For capstan and drum type devices you can choose `Media Saving`. For drum type devices you can also choose `Time Saving`.

If you choose `Media Saving` in the **Optimization** pop-up menu , the RIP rotates the image if it calculates that media can be saved by doing so. You should ensure that the media width is correctly set within the Cassette Manager to make this option work effectively. (See Chapter 8, "Media Management".) If the current device is a drum recorder, you can choose `Time Saving`, which rotates the page in whichever direction takes the least time to output.

Note: Some applications, such as QuarkXPress, generate a page size for the job which is dependent on the media width set in the application. Media saving often cannot work when processing jobs generated by these applications. To avoid this problem, make the media width in the application the same as the width of the page being created (including any crop marks which are to be printed).

4.15.1 Other options that save media

Selecting the **Trim page** check box in the **Effects** section causes the RIP to trim any white space off the top and bottom of each page.

When printing an image which does not contain a `PageSize` definition (such as an EPS), and also which is smaller than the currently configured page size, the **Trim Page** feature will trim the page size to that of the image size. For example, printing an A5 image to a Page Setup which has A3 defined as the

Page Size would normally result in a roll output device printing onto media A3 in size with an A5 image on it. With Trim Page selected, a roll output device will produce media A5 in size with an A5 image on it. This example illustrates that the amount of media used is considerably reduced.

Note: Trim page will trim to the full size of the image whether or not that image contains white space.

Note: If you are sending output to a device fed with fixed size sheets, such as a typical laser printer, using **Trim page** does not save media and is very likely to alter the registration between pages: for example, when the content of those pages has a variable outline or bounding box.

Several features listed in the **Enable Feature** pop-up menu of the Edit Page Setup dialog box instruct the RIP to use media as economically as possible. In general, these features pack pages together so that, for example, more than one page is imaged side by side in the length of media that would otherwise be used by one page. See “Features” on page 191 for a fuller description.

4.16 Default page size

Normally a job sets its own page size, and overrides the default page size. However, in some cases (such as when using the **Proof Fonts** command), the RIP uses the default page size.

You can specify the default page size by clicking **Page layout** (in the Edit Page Setup dialog box) to display the Page Layout dialog box. You can specify either a standard page size by name, or the absolute page width and height.

If you do not want to use a standard page size using **Page size**, specify your preferred values in the **Page width** and **Page height** text boxes. Sizes can be in inches, millimeters, picas, or points, depending on the current selection in the Select units pop-up menu to the right of the **Page width** box. When you have specified a nonstandard size, the RIP displays `Other` in the **Paper size** pop-up menu.

4.17 Margins

You can specify margins for a job by clicking **Page layout** to display the Page Layout dialog box. This dialog box varies slightly, depending on the type of device. The example in Figure 4.15 is for a sheet fed device.

You can set the margins by typing values into the appropriate text boxes. Any margins you specify are added to values set within the job.

Choose the units to use from the **Select units** pop-up menu. When you specify the left margin, the right margin is calculated automatically, based on the total width of the media and the size of the image. If you wish, you can specify a negative value for any margin. For example a -1.0 inch left margin would clip 1 inch off the left hand side of the page.

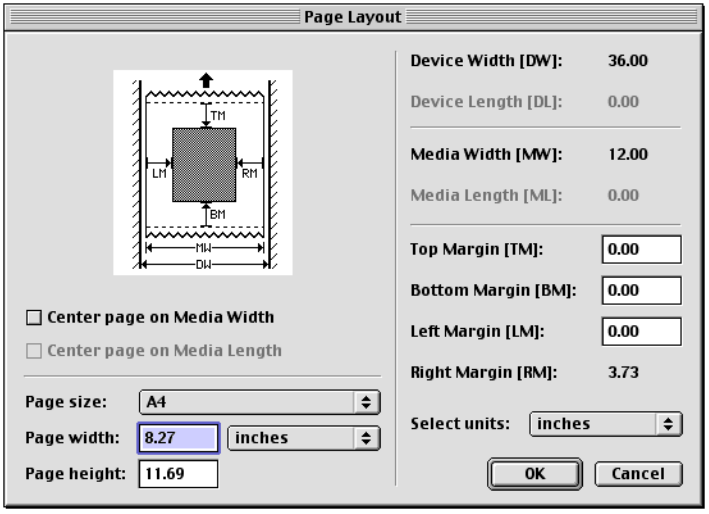


Figure 4.15 A typical Page Layout dialog box

You can center the page on the media by selecting the relevant option. Note that the page is always centered if you choose this option, even if the job itself explicitly sets the page width.

If you are using one of the multiple modes, the Page Layout dialog box is also available from the Info dialog box. This dialog box is displayed when you click **Info** in the Output Controller (see Section 5.3.2.2 on page 31). When chosen from the Output Controller, the page layout options are specific to the

selected page or, optionally, to all pages in the same job. When chosen from the Edit Page Setup dialog box, the options are applied to all jobs subsequently interpreted with that setup.

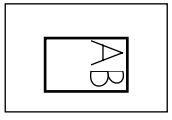
The output device dimensions are built into the driver for the current device, and cannot be changed. You can set the media width in the Cassette Manager. For details of how to use the Cassette Manager and other media management facilities, see Chapter 8, “Media Management”.

4.18 Printing effects

The **Effects** options in the Edit Page Setup dialog box allow you to produce output using assorted effects.

The dialog box displays a representation of a page (near the **Effects** label), in which the letters *AB* are written. You can either click the **Rotate**, **Negative**, and **Mirrorprint** options to select the effects, or you can click the Effects page to cycle through all the possible combinations of effects.

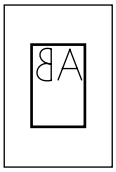
The Effects page changes as you select any of the options, illustrating the effects of using the selected combination.



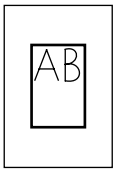
The **Rotate** pop-up menu allows you to select 90, 180, and 270 degree rotations. The image itself remains unchanged. If the job was already set to rotate in the opposite direction, the two rotations cancel, giving non-rotated output. Similarly, if the job rotates in the same direction, the two rotations add.

If **Negative** is selected, the page produced is in negative. If the job was already in negative (that is, a negative image is defined in the page description), the two negatives cancel each other out, giving positive output.

Using this option may affect the proper choice of calibration set—see Chapter 10, “Calibration”.



If **Mirrorprint** is selected, the RIP produces a mirrored image which is reflected about the vertical axis. However, if the job being sent was already reflected, selecting the **Mirrorprint** option cancels this out, giving a non-mirrored image.



Eclipse Release SP3 and later of the Harlequin RIP includes a **Control Strip** check box in the Effects panel of the Page Setup dialog box.

For more information see “Control strip” below.

4.19 Control strip

If you select this check box, a control strip is added to your job, based on the area available on the output medium. This is particularly helpful when creating proofs, because the control strip indicates the settings used for the job and allows you to analyze the print quality.

Note: The control strip is not suitable for use when outputting to platesetters.

The control strip includes:

- Logos identifying the RIP as a Harlequin RIP, including a Global Graphics Software (GGS) logo.

  Note to OEMs: The GGS logo may be replaced with that of the OEM partner through whom the RIP was sold. (See Technical Note Hqn 054 for more information).

- A color bar for both visual and colorimetric analysis of the print quality.
- A text slugline carrying data about the job file itself and the print configuration.

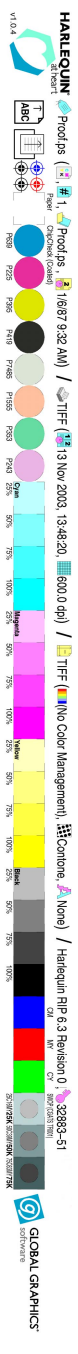
The color bar printed on cut-sheet media may be constructed using one, two or four lines of color patches, depending on the space available. It may include the following groups of patches:

- Step wedges, containing different numbers of patches at different tint values. These may contain CMYK or spot colors.

  Note to OEMs: Although not used in the configuration as shipped, the step wedges may also be set to include all of the colorants rendered on the proofer.

- Graduated linear tints.
- Progressives (secondary and tertiary colors built from Cyan, Magenta and Yellow).
- Neutral patches comparing CMY combinations with plain Black, and using values from a variety of standardized printing conditions, such as SWOP and ISO 12647-2.
- ChipCheck™—a patent-pending approach that allows the color accuracy of the proof to be tested quickly and cheaply without requiring the use of a colorimeter.
- PDF/X status, showing whether the job being printed is PDF/X compliant or not, and whether it claims to be.
- Orientation—showing the orientation of the page, and whether or not it is saved in negative in the original document.
- Feed direction—showing how the output was fed through the printer, as an aid to resolve some kinds of print artifacts.
- Enfocus Status Check reporting.

A sample control strip is shown below:



Harlequin Logo

Page orientation

Paper feed

Registration

Paper measurement

ChipCheck™

Process step wedges

Progressives

Neutrals

Global Graphics Software Logo

Job name

Job style

Page number

Job file name

File modification date and time

Output device

Print date and time

Resolution

Page setup name

Color setup name

Screening

Anti-alias factor

RIP version

Serial number

4.19.1 Control strip elements

The control strip contains some of the following elements, depending on your job configuration and the available space on your media.

4.19.1.1 Harlequin At Heart logo

Figure 4.16 Harlequin at Heart logo

The Harlequin at Heart logo is always part of a control strip and is located at the left end of the strip.

4.19.1.2 Orientation icon

Figure 4.17 Orientation icon

The orientation icon indicates the orientation of the job, that is, whether the job has been rotated and so on. It also shows as black on white if the incoming job was negative and forced to positive by the RIP.

4.19.1.3 Paper feed icon

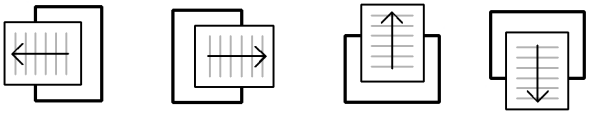


Figure 4.18 Paper feed icon

The paper feed icon indicates the direction in which the paper is fed through the printer.

4.19.1.4 Registration icon

Figure 4.19 Registration icon

The registration icon allows you to check for any misregistration errors.

4.19.1.5 Paper measurement icon

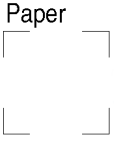


Figure 4.20 Paper measurement icon

The paper measurement icon allows you to take a paper white reading for the purposes of calibrating your measurement device.

4.19.1.6 PDF/X validation icon

Figure 4.21 PDF/X validation icon

When processing a PDF file the PDF / X validation icon will be displayed. If the file claims to be PDF / X-1a:2001 or PDF / X-3:2002 then the RIP will vali-

date that claim during interpretation. The claimed conformance level will be displayed above the PDF/X validation icon, and the characterized printing condition for which it was prepared will be displayed below it.

If the file is a valid PDF/X file the icon to the right will be a tick, otherwise a cross will be shown.

A PDF file that does not claim to be PDF/X compliant will show **Baseline PDF** on the green background.

Files that claim to be PDF/X conformance levels that are not explicitly supported by the RIP will not be validated, and will show a question mark in the black box to the right.This also applies to files that claim to comply with a conformance level which are not fully validated in the current page setup. For example, PDF/X files will not be validated if the option in the **Accept Type(s)** menu of the PDF Options dialog box has been set to `Any PDF <= 1.4 as basic PDF`, for instance.

4.19.1.7 PDF file status check icon

Figure 4.22 PDF file status check icon

If you select the **Do status check** check box in the PDF Options dialog box, you will see one of the above icons in your control strip.

The first icon in Figure 4.22 appears when a certified PDF file is printed, and when the PDF profile used to certify it matches one of the profiles selected in the PDF Options dialog box.

The second icon in Figure 4.22 appears when a certified PDF file is printed, but the PDF file was made with a PDF profile that does not match one of the profiles selected in the PDF Options dialog box.

The third icon in Figure 4.22 appears when a PDF file is printed that is not certified. That is, the PDF was file was never certified, or was certified but has changed since.

No icons are shown if the file printed is not a PDF, or if the **Do status check** check box has not been selected in the PDF Options dialog box.

4.19.1.8 ChipCheck™ strip

Figure 4.23 ChipCheck™ strip

ChipCheck™ is designed to allow very rapid and easy validation that a proofer has been correctly configured without requiring the use of instruments. It will identify whether an error has been introduced by, for example, the wrong media selection in the RIP interface, or whether the required calibration has not been performed. It can also quickly check whether a stored proof has aged enough to alter the colors significantly.

To read the strip, compare chips from a valid Pantone Coated swatch book with the patches in the color bar under appropriately controlled lighting (typically D50).

For even faster and easier checking of proofs, build a strip of Pantone chips in the correct order to compare with the patches.

4.19.1.9 Process step wedges

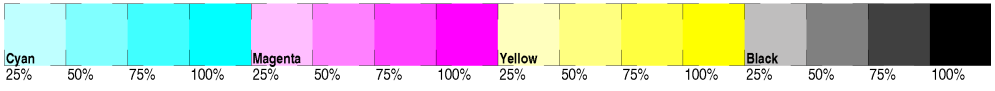


Figure 4.24 Process step wedges

The process step wedges allow you to measure the process colors at various increments. The increments used depend on the space available.

4.19.1.10 Progressives strip

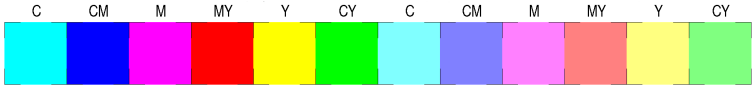


Figure 4.25 Progressives strip

The progressives strip allow you to measure color combinations. Each patch has a label above it indicating the colors used in the patch, for example, **CM** is a patch containing Cyan and Magenta. The percentage of each color varies, according to the space available. For example, the first six patches in the strip in Figure 4.25 contain 100% of each named color, and the last six patches contain 50% of each named color.

4.19.1.11 Neutrals strip

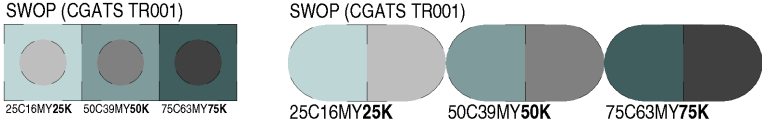


Figure 4.26 Neutrals strip

The neutrals strip allows you to test the neutral grays produced by your job settings. The neutral patches compare CMY combinations with plain Black, and use values from a variety of standardized printing conditions, such as SWOP and ISO 12647-2. The appearance of the neutrals strip varies depending on the space available.

Combined with ChipCheck (see Section 4.19.1.8), this provides a very rapid method of checking the configuration of the proofing device. If the CMY combinations do not match the K tints you may have selected the wrong media in the RIP, or you may need to recalibrate the printer.

4.19.1.12 Company logo

Figure 4.27 Company logo

The company logo always appears on the control strip and represents the distributor of the Harlequin RIP.

Note to OEMs: The GGS logo may be replaced with that of the OEM partner through whom the RIP was sold. (See Technical Note Hqn 054 for more information).

4.19.1.13 Job name icon

Figure 4.28 Job name icon

The job name icon precedes the job name.

4.19.1.14 Job style icon

Figure 4.29 Job style icon

The job style icons indicate the separations, screening and color **Style** used for the job, as specified in the page setup.

The first icon in Figure 4.29 indicates a composite color job; the second icon indicates an unrecombined, preseparated job, and the third icon indicates a recombined, preseparated job (monochrome jobs will be marked as composite)

4.19.1.15 Page number icon

Figure 4.30 Page number icon

The page number icon precedes the page number. Note that the page number is the page number within the current file. If for example, you have printed to PostScript from your design application and chosen to print just pages 7 and 8, then they will be labelled as pages 1 and 2 on the proofs.

4.19.1.16 Job file name icon

Figure 4.31 Job file name icon

The job file name icon precedes the job file name.

4.19.1.17 File modification date icon

Figure 4.32 File modification date icon

The file modification date icon precedes the date and time at which the file was last modified. The file modification date will only be shown if it is recorded in the file.

Note: The brackets and slashes within the control strip delimit different parts of the strip. The date in the first set of brackets is the file modification date (if available), and the date in the second set of brackets is the print date.

4.19.1.18 Print date icon

Figure 4.33 Print date icon

The print date icon precedes the print date and time.

Note: The brackets and slashes within the control strip delimit different parts of the strip. The date in the first set of brackets is the file modification date (if available), and the date in the second set of brackets is the print date.

4.19.1.19 Scale icon

Figure 4.34 Scale icon

The scale icon precedes details of the scale factor, for example, **50.0%**.

4.19.1.20 Clipped icon

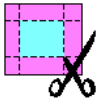


Figure 4.35 Clipped icon

The clipped icon is a warning that not all of the 'page' of the job may be shown. This may be due to the fact that the non-printing margins of the output device have not been accounted for. See Section 4.19.2.2 for more details.

4.19.1.21 File creator icon

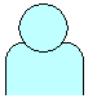


Figure 4.36 File creator icon

The file creator icon precedes the name of the person and / or machine that created the PostScript or PDF file. This information is only displayed if it is recorded in the file.

4.19.1.22 Output device icon

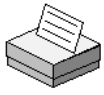


Figure 4.37 Output device icon

The output device icon precedes the name of the output device, for example, **TIFF**.

4.19.1.23 Page setup name icon

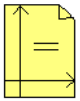


Figure 4.38 Page setup name icon

The page setup name icon precedes the page setup name.

4.19.1.24 Color setup name icon

Figure 4.39 Color setup name icon

The color setup name icon precedes the name of the color setup. If the default color setup is being used, then the text **(No Color Management)** is displayed.

4.19.1.25 Screening icon

Figure 4.40 Screening icon

The screening icon precedes details of the type of screening used, for example, **HDS Fine**.

4.19.1.26 Resolution icon

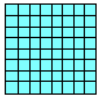


Figure 4.41 Resolution icon

The resolution icon precedes the resolution details, for example, **300.0 dpi**.

4.19.1.27 Anti-alias factor icon

Figure 4.42 Anti-alias icon

The anti-alias icon precedes the details of the anti-alias factor, for example, **3x3**. The **Anti-Aliasing** option is available in the Configuration dialog box of various plugins, such as the TIFF plugin.

4.19.1.28 Serial number icon

Figure 4.43 Serial number icon

The serial number icon precedes the Harlequin RIP serial number details. This allows you to identify the Harlequin RIP that produced the proof.

4.19.2 Configuration

4.19.2.1 Page image positioning

The page image will normally be placed in the lower left corner of the imageable area of the printer (after allowance for the control strip). It can be centered in the imageable area in either dimension using the **Center page on Media Width/Length** check boxes in the Page Layout dialog box. These options will not move the control strip, which will remain along one side of the sheet or roll.

4.19.2.2 Margins file

In some cases, the following warning may be displayed in the RIP Monitor window:

```
%%[ WARNING: Control Strip: no margins file found, output may be
clipped ]%%
```

If necessary, speak to your plugin supplier for further details on margins files.

4.20 Scaling the image

You may not always want to print your job at its original size. The horizontal and vertical scaling boxes in the Edit Page Setup dialog box allow you to print out any job at a specified scale. This changes the page size.

All scales are expressed as a percentage of the original size. Thus, to print out a copy of a job at half the linear size, specify 50 in both the horizontal and vertical scaling text boxes. To print it out at twice the size, specify 200.

You can specify different horizontal and vertical scales if you wish. Note that the aspect ratio of the image changes unless the values in the horizontal and vertical scaling boxes are the same.

Screen ruling is not affected by the scale at which a job is output.

4.21 Features

You may sometimes want to apply a special effect to your jobs that is not otherwise available from the Edit Page Setup dialog box. You can do this in the Harlequin RIP by using *features*. These are both powerful and easy to use.

For instance, you can use a feature to perform a simple page imposition that prints two pages side by side (and at reduced-scale if required) on one normal sized page to reduce media consumption when in the draft stages of document production. Another feature scans PostScript-language jobs for the use of spot colors and reports the colors on screen before you print.

You can use features by choosing one from a pop-up menu, without knowing how they work, but with a little knowledge you can add new features. A Harlequin RIP feature is a fragment of PostScript-language code which is executed just before a job is run. The fragment specifies the changes to be made to the interpretation of that job, but is completely independent of it.

4.21.1 Using features

Several page features are supplied with the RIP, ready for immediate use. To use one of these features, select the **Enable Feature** check box and select a feature from the pop-up menu. Make any other settings you wish and save the page setup. The feature is applied to all jobs using that page setup until you clear the check box.

Many of the features enable you to save media by packing pages on large format devices, or to get more information about jobs and any errors arising from jobs. In addition, one feature (`Image replacement`) enables substitution of high resolution images for PostScript-language jobs, using Open Prepress Interface (OPI) and Desktop Color Separation (DCS) schemes.

The page features currently supplied and supported are:

2 across	This imposes two pages side by side on the film. By default no space is left between the pages—the `OptimalGutter` value below may be edited to change this effect.

2 up
: This imposes two pages one above the other on the film. By default no space is left between the pages—the `OptimalGutter` value below may be edited to change this effect.

Bounding Box
: This will read `BoundingBox` and `PageBoundingBox` comments in PostScript files interpreted through the RIP and will use the page size and origin position set in these comments as long as no page size has already been explicitly set by the job. This is useful for processing EPS files which should not explicitly set page sizes, but which may have an origin at some distance from the lower left corner of the image.

Crop Marks
: This will add crop marks and gray wedges to a page output through the RIP. If the page is monochrome, register marks, crop marks, file name, time & date of processing and a single gray wedge will be added.

  If the page is a composite page being auto-separated by the RIP, register marks, crop marks, file name, time & date will be added, along with a step-wedge for each of CMYK, and a set of progressive patches for ink-trapping and neutral density tests.

  If the job is preseparated, the RIP will also detect the color of each plate and add the appropriate marks.

  If the page is being auto-separated and also includes spot separations, crop and register marks will be added to each spot separation plate, and a note of the plate name included.

Error Handler (Long and Short)
: Error messages generated by the RIP are generally fairly concise. These page features make the RIP generate longer and shorter (but longer than normal) error messages.

Fill Film
: This puts as many pages of a multi-page job onto the output media as will fit. The size of the input pages is determined by the `setpagedevice` or `setpageparams` call, or the first `BoundingBox` or `PageBoundingBox` comments if there is no `setpagedevice`, and as Letter if there is no indication at all. The output page size is taken as it stands on entry, typically from the page setup.

Image Replacement
: This will load both OPI and DCS image replacement code.

List Spot Colors
: This lists to the system monitor / console the names of all the spot colors accessible in the current job. Also loads the level 1 separator so all level 1 spot colors are also displayed.

Print info on error
: Use this to add additional information related to PostScript errors to the output, and to image the page interpreted so far.

Print page on error
: Use this file as a page feature (or a boot option in `HqnOEM`) to print partial pages when a PostScript error other than interrupt or timeout occurs.

Note: Each page feature is a simple text file and contains a similar description, sometimes with more detail, as a comment.

4.21.2 Adding other features

The **Enable Feature** list provides a number of commonly useful features, but there are other supplied examples that you can add to the list and a PostScript-language programmer can create many more. One of the supplied examples (`Draft`) prints the word *Draft* on each page. Another one (`Pack`

Drum) saves film by packing images on a drum recorder in the way that Fill Film does on a sheet-fed device and Pack Capstan does on a capstan recorder. Finally, PGB hot folder enables you to resubmit page buffers to the version of the RIP that produced them.

Note: All page features in the Examples folder are supplied as an illustration of what is possible with the Harlequin RIP. The page features are believed to work as described but they are not supported as a part of the Harlequin RIP. Page features that appear in the **Enable Feature** list are supported but are documented only in the PostScript-language files.

A feature appears in the **Enable Feature** list only if there is a corresponding PostScript-language file in the Page Features folder in the SW folder where you have installed the RIP. The name of the feature in the dialog box is the same as the file name.

All the other supplied examples are files in an Examples folder in the Page Features folder. There is also a file called Read Me that describes the example features and how to create others. To make an example feature available, copy the file from Examples into the enclosing Page Features folder and display the Edit Page Setup dialog box.

Similarly, to remove a feature, move it from the Page Features folder into the Examples folder.

You can add other, new, features by creating appropriate PostScript-language files and placing them in the Page Features folder.

Note to OEMS: Extensions to the PostScript language have been created which OEMs may want to use when writing their own features. Contact Global Graphics for the *Using Harlequin RIP Extensions* manual.

4.22 Cassette management

If you are using the media management facilities to keep track of the amount of media you have left in your output devices, or if you are using media optimization, you must specify the cassette which is to be used with the page setup. Do this using the **Cassette** pop-up menu in the Edit Page Setup dialog

box. Note that if you change the **Device**, you have to choose a cassette name from the **Cassette** list, unless media management is disabled for that device.

See Chapter 8, “Media Management”, for more details.

4.23 Page Setup Options

The Page Setup Options dialog box, shown in Figure 4.44, provides several options that affect the way the RIP processes jobs. Display this dialog box by clicking the **Options** button in the Edit Page Setup dialog box.

Several options provide compatibility with jobs using PostScript LanguageLevel 2 or LanguageLevel 1. Other options deal with more general fault conditions or are convenience features. (Click the **Extras** button in this dialog box to see options specific to job-creating applications: see Section 4.24 on page 200 for details.) This section describes each option in the dialog box.

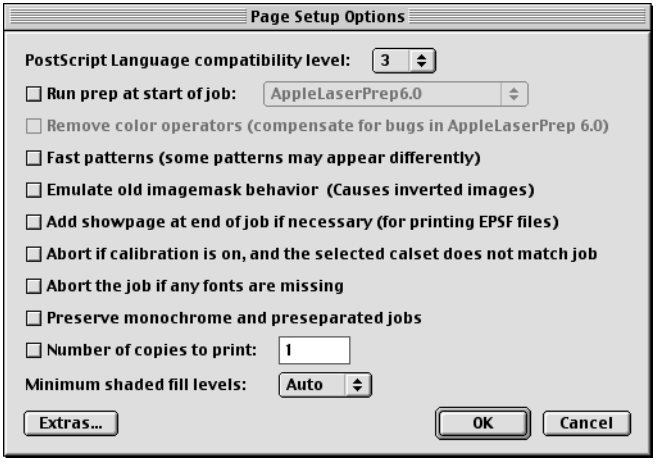

Page Setup Options
PostScript Language compatibility level:
3
Run prep at start of job:
AppleLaserPrep6.0
Remove color operators (compensate for bugs in AppleLaserPrep 6.0)
Fast patterns (some patterns may appear differently)
Emulate old imagemask behavior (Causes inverted images)
Add showpage at end of job if necessary (for printing EPSF files)
Abort if calibration is on, and the selected calset does not match job
Abort the job if any fonts are missing
Preserve monochrome and preseparated jobs
Number of copies to print:
1
Minimum shaded fill levels:
Auto
Extras...
OK
Cancel

Figure 4.44 Page Setup Options dialog box

4.23.1 PostScript Language compatibility level

This option allows you to choose the level of PostScript-language compatibility for jobs submitted to this page setup. You can choose PostScript LanguageLevel 1, 2, or 3.

By default, this option is set to 3, because most jobs run correctly and this setting allows the RIP to use the maximum number of PostScript-language features and Harlequin RIP extensions. The result is often faster operation or increased output quality.

You may need to set the value to 1 or 2 for a small number of older jobs to run correctly. For example: if you set this option to 2, the RIP interprets jobs using the Level 2 PostScript-language conventions, together with any non-conflicting Harlequin extensions. This means that level 2 jobs run in exactly the expected environment. Well-constructed level 3 jobs also run but are likely to operate more slowly if they use features better supported in LanguageLevel 3.

4.23.2 Run prep at start of job

Prep files are libraries of PostScript-language routines that can be downloaded into a RIP and used whenever necessary. Many LaserWriter drivers require certain libraries to be loaded before they can be used. See Section 6.9.1 on page 266, for details.

If the box for this option is selected, and a prep file chosen from the pop-up menu, the chosen prep file is run at the start of every job that is interpreted with the relevant page setup.

By default, this option is not selected.

4.23.3 Remove color operators

This option also provides compatibility. There are two cases where you should consider using it.

- One case occurs because of a bug in LaserWriter Driver 6.0. If you are using this driver and get a PostScript-language error, especially if the sending application is Freehand (formerly from Aldus, now Macromedia), then select this option and output the job again.
- Some applications use PostScript Level 1 extended color operators incorrectly, producing incorrect (for example, blank) output. If you select this option, the RIP uses basic color operators instead, and output appears correctly.

Note: This option is available only when the **PostScript Language compatibility level** option is set to `1`. Color operators are always available in PostScript LanguageLevel 2 and 3.

4.23.4 Fast patterns

This option enables Level 1 PostScript patterns defined as halftone screens to be processed more quickly, but at a lower resolution than normal. You should not use this option if you require high quality images, since the option makes the output of any user defined patterns have a more grainy texture than normal at resolutions above 300 dpi.

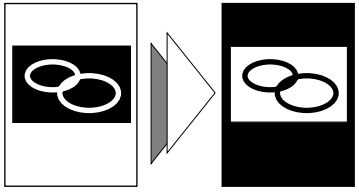
By default, this option is not selected.

4.23.5 Emulate old imagemask behavior

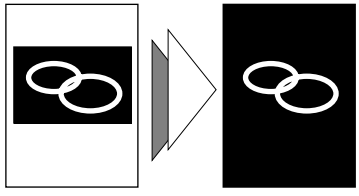
This option is used to overcome a now rarely seen bug in a previous version of the Adobe interpreter. The effects of this bug may still be present in some older files of PostScript-language code.

By selecting the **Emulate old imagemask behavior** check box, you can print these old jobs correctly.

By default, this option is not selected.



Consider the case where a page of PostScript-language code contains a negative image mask. If the page is itself printed in negative, the image mask appears normal, as illustrated on the left.



In older jobs, negative image masks are still printed in negative, producing the error illustrated on the left. This is because the PostScript-language code in the job is attempting to rectify a bug that is no longer present.

4.23.6 Add showpage at end of job if necessary

Certain PostScript-language file formats, such as EPS, EPSF, or EPSI (all forms of encapsulated PostScript), do not necessarily include a showpage operator at the end of the job. To print these files directly from a RIP, a showpage may need to be added. If this option is selected, the RIP automatically appends a showpage to jobs when necessary.

Note: If a job containing a PostScript-language error is aborted, any partially complete page is processed and output.

By default, this option is not selected.

4.23.7 Abort if calibration on, and the selected cal set does not match job

If you require job calibration, select this option to prevent the RIP printing jobs with an inappropriate calibration set. The calibration set is specified in the page setup. See Chapter 10, "Calibration" for details.

By default, this option is not selected.

4.23.8 Abort the job if any fonts are missing

Select this option to ensure that a job is aborted if any font it uses is not available. If you leave this option unselected, the RIP attempts to use a suitable replacement for any missing font.

By default, this option is not selected.

You are able to specify Default fonts in the SW/Config/FontSubstitution file. See Section 9.10 on page 367 for more details.

4.23.9 Preserve monochrome and preseparated jobs

Select this option only if it is important to emulate the behavior of a traditional separating workflow when a monochrome or preseparated job is submitted to the RIP using a page setup that is intended for automatic separation of composite color jobs.

This option helps you avoid the extra non-useful, sometimes blank, separations that can be produced when a monochrome or preseparated job is acci-

dentally submitted using a page setup that is intended for automatic separation of composite color jobs.

Selecting this option ensures that the RIP generates correctly labeled separations. Select this option to make monochrome jobs produce a single black separation, and to make preseparated color jobs produce correctly labeled separations.(Even though correctly labeled, the separations may also be blank.)

Note: You can avoid blank separations by selecting `Not Blank` in the **Print** column of the Edit Style dialog box, as described in Section 11.7.1 on page 441. That option is slightly different because if it is used alone on preseparated jobs in a separating workflow then the resultant separation may have the wrong label: for example, a preseparated job for CMYK may produce only four K (black) separations. It can be useful to use both options together.

4.23.10 Number of copies to print

This text box contains the number of copies of a job that are to be printed. You can type a new value into the box to specify a particular number of copies.

By default, this option is set to `1` (one).

4.23.11 Minimum shaded fill levels

With the introduction of PostScript LanguageLevel 3 and PDF version 1.3, it is possible to construct vignettes using Shaded Fills. There are a number of controls available to impact the quality of these Shaded Fills and one which is particularly important is the smoothness setting.

This option essentially controls the number of steps used to produce a vignette. Some applications set smoothness to a value which will not produce good results on some devices (Adobe Acrobat sets a value of 50). In this case, vignettes are constructed in a way which reveals noticeable banding. Typically, the creating application can be set to use a more sensible default value, however this can be difficult to implement for all creators of PDF files. For this reason the **Minimum shaded fill levels** option is available.

This option allows you to set sensible override values.

Minimum shaded fill levels sets a limit which controls the minimum number of steps that can be used in constructing a vignette. This is important in ensuring vignettes do not have banding.

From Eclipse Release SP4 the default **Minimum shaded fill levels** value is **Auto** which optimizes the value to suit the currently selected page setup, and in particular the screening setting.

The **Minimum shaded fill levels** option has a drop down menu allowing selection of various pre-configured values. The higher the value you select, the more shaded fill levels are created, and the more work the RIP has to do to create those levels, resulting in reduced output rate. If **Auto** is selected, the RIP automatically optimizes the **Minimum shaded fill levels** to suit the current page setup. For example, if the current page setup employs screening that allows only 64 shades of gray, the RIP will optimize the **Minimum shaded fill levels** so that it uses only 64 shades. In addition to this, if the page setup allowed 256 shades you can make the RIP run faster by manually selecting a lower value, such as 128.

4.24 Page Setup Option Extras

The Page Setup Option Extras dialog box, shown in Figure 4.45, enables you to alter the way the RIP processes jobs produced by specific applications. The topics include color management, font substitution, and vignettes in spot colors.

Note: The treatment of embedded color management and spot color vignettes is the same whether the job submitted to the RIP is: a file produced directly by the named application; or a file produced by a page make-up application and referencing or containing a file from the named application. *There are differences* in what is possible with different file formats from some applications, as noted for each option: typically, an EPS file is handled better than a PostScript-language file printed directly from the named application.

Display this dialog box by clicking the **Extras** button in the Page Setup Options dialog box. This section describes each option in the dialog box.

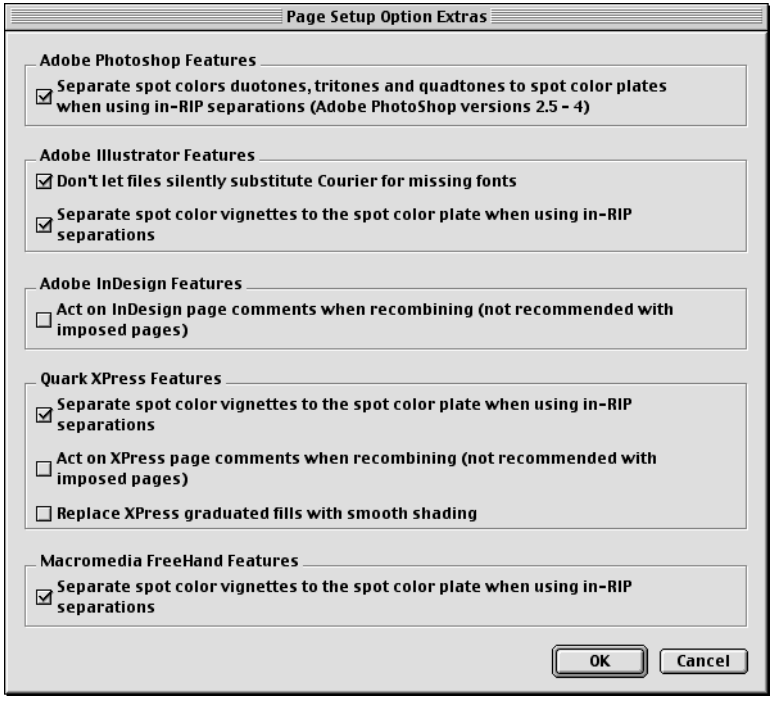

Page Setup Option Extras
Adobe Photoshop Features
Separate spot colors duotones, tritones and quadtones to spot color plates when using in-RIP separations (Adobe PhotoShop versions 2.5 - 4)
Adobe Illustrator Features
Don't let files silently substitute Courier for missing fonts
Separate spot color vignettes to the spot color plate when using in-RIP separations
Adobe InDesign Features
Act on InDesign page comments when recombining (not recommended with imposed pages)
Quark XPress Features
Separate spot color vignettes to the spot color plate when using in-RIP separations
Act on XPress page comments when recombining (not recommended with imposed pages)
Replace XPress graduated fills with smooth shading
Macromedia FreeHand Features
Separate spot color vignettes to the spot color plate when using in-RIP separations
OK
Cancel

Figure 4.45 Page Setup Option Extras dialog box

4.24.1 Adobe Photoshop features

These options control handling of features found in jobs from Adobe Photoshop.

> **Note**: The **Honor 'PostScript Color Management'** check box has been removed. The option is now called **Override color management in job** and is part of the **Input Document Controls** within the **Color Setup Manager.** See Section 11.8 on page 450 for more details.
>
> To make fullest use of jobs containing device-independent color definitions, enable a color option in the Configure RIP Extras dialog box.

Separate spot color duotones, tritones & quadtones to spot color plates

This option enables the interception of Photoshop duotones, tritones, and quadtones when encountered in EPS files. Select this box if you want to separate spot color duotones, tritones, and quadtones to spot color separations.

For this option to take effect, select a RIP separations style that creates separations and that enables the relevant spot color separations. The separations style must either specify a separation for each spot color or have `(Other colors in job)` set to `Yes`. See Section 11.7.1, "Producing separations" on page 441 for details.

Note: This option is available only when the **PostScript Language compatibility level** option is set to 3. It is only relevant for Photoshop versions 2.5 through 4; Photoshop version 5 does this automatically if imaged in LanguageLevel 3.

For more information see Section 1.3.3.2, "Duotones, tritones, and quadtones"

By default, this option is selected.

Note: Photoshop images saved to EPS always include the input profile from Photoshop, which a job may not want to actually have applied when color managing. For details on overcoming this, see Appendix C of the *Harlequin RIP Extensions manual*.

4.24.2 Adobe Illustrator features

These options control handling of features found in jobs from Adobe Illustrator.

Don't let files silently substitute Courier for missing fonts

Illustrator 7 checks for font availability and replaces any unavailable fonts with Courier. This means that changing the default font or selecting the **Abort the job if any fonts are missing** option in the RIP would have no effect.

If you select this option, the RIP ignores the font substitution in the Illustrator PostScript-language code. You can then change the default font or select the **Abort the job if any fonts are missing** option. This options applies to both PostScript and EPS files from Illustrator.

By default, this option is selected.

Separate spot color vignettes to the spot color plate

For both Illustrator 6 and 7 files: if you select this option, the RIP places the spot color vignettes on the appropriate spot color separations, if available.

There are limitations: all vignettes appear in process separations when the job submitted to the RIP is a PostScript file printed directly from Illustrator; and vignettes from a spot color to a process color appear in process separations even when the job is in EPS format.

For this option to take effect, select a RIP separations style that creates separations and that enables the relevant spot color separations. The separations style must either specify a separation for each spot color or have `(Other colors in job)` set to `Yes`. See Section 11.7.1 on page 441 for details.

For Illustrator 6 files: if you do not select this option, the RIP honors the information in the job and places spot color vignettes on the process color separations rather than the spot color separations.

For Illustrator 7 files: if you do not select this option, the result depends on the separations style and on the information in the job.

If the separations style generates a separation for a particular spot color, the RIP places a vignette in that spot color on the spot color separation.

However, if `(Other colors in job)` is set to `Yes` the RIP will generate a separation for a spot color if it encounters a flat tint in that color, but not if it encoun-

ters a vignette in that color. Once the spot color separation exists, the RIP will add a vignette in that color to the separation. If the spot color separation does not already exist, the RIP places the spot color vignette on the process color separations.

Note: This option is available only when the **PostScript Language compatibility level** option is set to 3.

By default, this option is selected.

4.24.3 Adobe InDesign features

This option controls handling of features found in jobs from Adobe InDesign.

Act on InDesign page comments when recombining...

Select this option if you wish to recombine preseparated jobs submitted directly from InDesign, where there may be missing separations. When you select this option, the RIP is able to recombine InDesign jobs by analyzing comments in the job. For example, the RIP can detect which separations to recombine into a page when given a sequence of separations such as MYKC-MYK…

Leave this option unselected if you are processing jobs that do not come directly from a file created by InDesign, for example after being assembled in an imposition package after output from InDesign.

By default, this option is not selected.

4.24.4 QuarkXPress features

This option controls handling of features found in jobs from QuarkXPress.

Separate spot color vignettes to the spot color plate

The PostScript-language code generated by QuarkXPress places spot color vignettes on the process color separations rather than the spot color separations.

If you select this option, the RIP places the spot color vignettes on the appropriate spot color separations, if available. (This option applies fully to PostScript files printed from QuarkXPress.) For this option to take effect, select a RIP separations style that creates separations and that enables the relevant spot color separations. The separations style must either specify a separation for each spot color or have (`Other colors in job`) set to `Yes`. See Section 11.7.1 for details.

Note: This option is available only when the **PostScript Language compatibility level** option is set to `3`.

By default, this option is selected.

Act on XPress page comments when recombining...

Select this option if you wish to recombine preseparated jobs submitted directly from QuarkXPress, where there may be missing separations. When you select this option, the RIP is able to recombine QuarkXPress jobs by analyzing comments in the job. For example, the RIP can detect which separations to recombine into a page when given a sequence of separations such as MYKC-MYK…

Leave this option unselected if you are processing jobs that do not come directly from a file created by QuarkXPress, for example after being assembled in an imposition package after output from QuarkXPress.

By default, this option is not selected.

Replace XPress graduated fills with smooth shading

Select this check box to replace graduated fills produced by QuarkXPress with LanguageLevel 3 smooth shading (shaded fills). Shaded fills generally produce better visual quality and may be faster to generate. You can use this selection if you are using the TrapPro trapping option. This is because TrapPro can handle shaded fills.

Note: This option is available only when the **PostScript Language compatibility level** option is set to 3.

By default, this option is not selected.

4.24.5 Macromedia FreeHand features

This option controls handling of features found in jobs from Macromedia FreeHand.

Separate spot color vignettes to the spot color plate

The PostScript-language code generated by FreeHand places spot color vignettes on the process color separations rather than the spot color separations. If you select this option, the RIP places the spot color vignettes on the appropriate spot color separations, if available.

There is one limitation: all vignettes appear in process color separations when the job submitted to the RIP is a PostScript file printed directly from FreeHand. Use the EPS file format to enable this option to work correctly.

For this option to take effect, select a separations style that creates separations and that enables the relevant spot color separations. The separations style must either specify a separation for each spot color or have `(Other colors in job)` set to `Yes`. See Section 11.7.1 on page 441 for details.

Note: This option is available only when the **PostScript Language compatibility level** option is set to 3.

By default, this option is selected.

4.25 PDF Options

This button displays the PDF Options dialog box, in which you can set the options for printing PDF files. Using these options you can, for example, print a range of pages rather than the whole file or specify which versions of PDF file to accept. You can also supply a user password, to enable the RIP to print

password-encrypted files. In addition you can apply Enfocus PDF preflight checking to incoming PDF documents.

See Section 7.11, “Printing PDF files” on page 301 for details.

4.26 Calibration

The Harlequin RIP can apply one or more calibration sets to a job. If you are printing to a direct output device, the page setup can include a calibration for the output device and a tone curve calibration.

If you are preparing a job for a printing press, the page setup can include an imagesetter calibration, a tone curve calibration, and calibrations for the intended and actual presses. If the page setup uses an ColorPro color setup, the intended press calibration is disabled.

Calibration sets are created for a particular device and color space. You can only select a calibration set for the currently selected device and color space. The choice of separations style determines the color space. Note that, while an imagesetter is not a multi-color device, you can create a calibration curve for each color in the separations style, to take account of the different screen angles likely to be used for the colors.

To create or edit a calibration set, click the **Calibration Manager** button, which is the icon button in the **Calibration & Dot Gain** section of the Edit Page Setup dialog box. See Chapter 10, “Calibration”, for more information.

4.26.1 Device calibration

The **Calibration** pop-up menu contains a list of all calibration sets for the currently selected device and color space. Select `(None)` for no device calibration.

Typically, you select a calibration set that has been prepared for the resolution, screen frequency, dot shape, positive / negative setting, and exposure of the page setup that you are editing. The dot shape and screening details are set in the separations style.

Some output plugins—for example, ProofReady plugins—are supplied with reference calibration profiles, typically named in this form: (*`Media_name Resolution`*), where *`Media_name`* and *`Resolution`* represent values suitable for the output device. These profiles appear in the list of calibration sets and you can

use these profiles in the same way as any other calibration set. The additional feature of these profiles is that selecting a reference calibration profile, or a calibration set that you have based upon one, is enough to apply a default color management setup provided that you have enabled an color management option. See the manual for the relevant output plugin or the *Harlequin ColorPro User's Guide* for details.

4.26.2 Press calibration

The **Actual Press** pop-up menu contains a list of all calibration sets created for the `Printing Press` device in the current color space. Select `(None)` for no press calibration. There is default entry supplied for `(SWOP (CGATS TR001))`, and there may be others.

Note: Some of the press calibration sets may be derived from profiles when you are using ColorPro. See the *Harlequin ColorPro User's Guide* for details. You can add other entries, as described in Chapter 10, "Calibration".

4.26.3 Use of a different printing press

If you are not using ColorPro, you can retarget a job from its intended printing press to another printing press, using the **Intended Press** option.

This is a complex topic in the general case, discussed more fully with reference to calibration in Section 10.8 on page 395.

In summary, the overall effect of press calibration in the output path is to first apply any primary calibration (for example, as required for an imagesetter), to remove compensation for the gain of the **Intended Press**, and then to compensate for the gain of the **Actual Press**.

The **Intended Press** calibration is not available when ColorPro is enabled. Instead, several options are provided for processing color data ahead of the transfer to press. These options include emulating the output of one press on another type of press. For details, see the separate *Harlequin ColorPro User's Guide*. The calibration set specified in **Actual Press** is always used.

The **Intended Press** pop-up menu contains a list of all calibration sets created for the `Printing Press` device in the current color space. If you have a scanned image that was not aimed at a specific press, select `(None)` for no

intended press calibration. There is a default entry supplied for (SWOP (CGATS TR001)), and there may be others.

Note: Some of the press calibration sets may be derived from profiles when you are using ColorPro. See the *Harlequin ColorPro User's Guide* for details. You can add other entries, as described in Chapter 10, "Calibration".

4.26.4 Tone curves

Tone Curves allow you to make another set of color adjustments, in addition to the device calibration and the press calibration. The **Tone Curves** pop-up menu contains a list of all calibration sets created for the Tone Curves device in the current color space. Select None for no tone curves calibration.

See Section 10.7 on page 394 for more details.

4.27 Other page setup options

Accelerate

The **Accelerate** button displays a dialog box to control the optional Harpoon PCI screening accelerator, consisting of hardware and special control software.

The **Accelerate** button is grayed out when you have chosen an inappropriate output device or there is no screening plugin: Harpoon PCI can be used with any screened output (bitmap) plugin. See Appendix D, "Harpoon PCI Screening Accelerator" for details.

5

Screening

This chapter describes halftone screening in monochrome and color work, and the different types of screening offered by the RIP. You use the screening options in the RIP in combination with the options that control color separations, to create a combined color *separations style*.

The RIP does not restrict the concept of color separation to producing separated output. When processing any job, the RIP creates a separation for each process colorant and also, where appropriate, for spot colorants. The output format determines whether the separations are printed together as a composite, or separated. By configuring these separations you can control the printing of individual colorants in the job. Although there is only one separation in the monochrome color space, the RIP provides the same options for configuring that separation.

Separations information is saved together with screening information in a separations style, which can be used in several page setups. You can keep a number of separations styles that you use regularly, for example to define different screening options.

5.1 Managing separations styles

Separations styles are created and managed in the Separations Manager, as shown in Figure 5.1. You can open the Separations Manager by clicking the

Separations Manager icon button next to the **Style** pop-up menu in the Edit Page Setup dialog box, or by choosing the **Color > Separations Manager** command.

5.2 Separations Manager dialog box

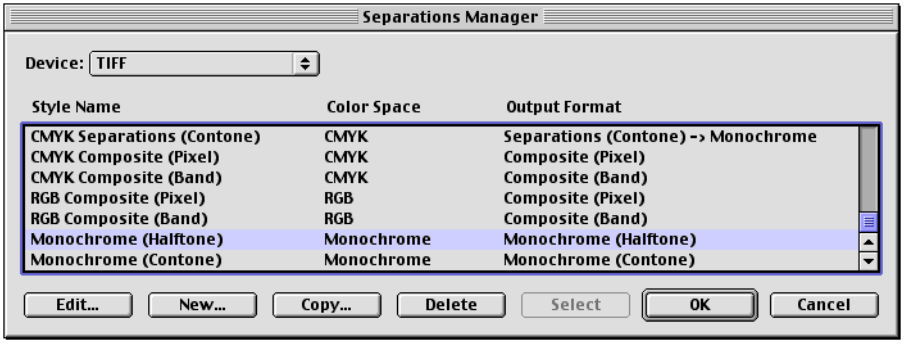


Figure 5.1 Separations Manager dialog box

The Separations Manager displays a list of all existing separations styles for the current device, showing the name of each separations style, the corresponding color space, and the output format.

From the Separations Manager you can create separations styles, and edit, copy, or delete existing separations styles. This chapter describes how to set the screening options for an existing separations style. For details about creating separations styles, see Chapter 11, “Color Separation”.

Select a separations style from the list and click **Edit**. The Edit Style dialog box appears. If the output format of the separations style supports screening, the Edit Style dialog box contains screening options, as shown in Figure 5.2. For example, if you choose a separation style with an output format of halftone separations, the Edit Style dialog box contains screening options.

The screening options do not appear if the output plugin for the selected output device does not support screening. This usually means that the output device supports continuous tone (contone) output or that the device accepts contone data and performs its own screening. For devices that can be configured to support either contone or screened output, the screening options in the Edit Style dialog box do not appear when you select a contone separations

style, unless you are using external screening, such as the Harpoon PCI screening accelerator.

Some proofing output plugins list two entries (for **Device** in the Edit Page Setup dialog box) for each model of printer that the plugin supports. One entry is for a device that uses the screening options in the RIP, which appear in the Edit Style dialog box for that device. The second device performs its own screening, such as error diffusion screening (EDS), and does not have screening options in the Edit Style dialog box.

5.3 Edit Style dialog box

The Edit Style dialog box (shown in Figure 5.2) appears when you select a separations style and click **Edit** in the Separations Manager.

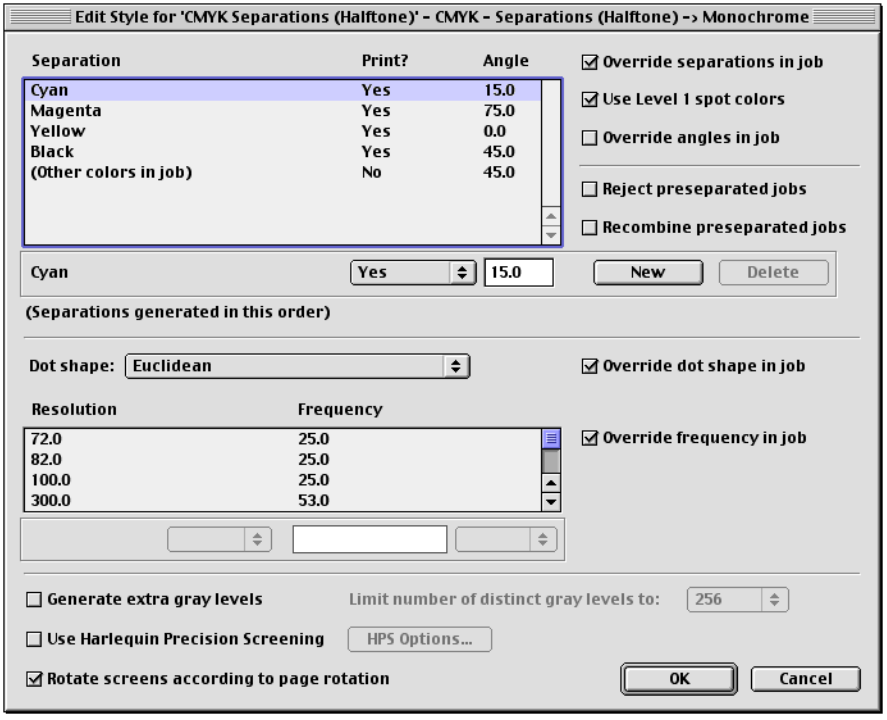


Figure 5.2 Edit Style dialog box with screening options

The screening options in the Edit Style dialog box include some familiar to anyone who has used screening and some that are specific to the Harlequin RIP.

- Section 5.4, “Halftoning”, is a quick introduction to concepts if you are unfamiliar with screening and halftoning.
- Section 5.5, “Screen angles”, on page 222, Section 5.6, “Dot shapes”, on page 224, and Section 5.7, “Halftone frequency”, explain how to use three basic screening functions.
- Section 5.8, “Screening options and number of gray levels” on page 229 describes an area where the Harlequin RIP technology provides some unconventional and valuable functionality.

The remaining sections in this chapter describe more subtle controls and some optional features of the Harlequin RIP.

5.4 Halftoning

Halftoning is the process of approximating gray levels or color shades with a pattern of dots. In many halftoning systems, the dots can have only one color value but can vary in size to alter the ratio of dot color to background color. The simplest use of this technique is approximating gray levels with a pattern of black dots against a white background, as illustrated in Figure 5.3.

Here, the size of the dots varies to represent different shades of gray. You see an area of small dots as a light gray, while an area of larger dots (each nearly filling its allowed space in the pattern of dots) is seen as dark gray. More strictly, it is not the size of the dots but the resultant ratio of black area to white area that represents the gray value.

Figure 5.3 An example of halftoning

Color shades are approximated with three patterns of dots, each in a primary color—cyan, magenta, and yellow—used with or without a fourth pattern of black dots. (This description of halftoning assumes three patterns—in fact, the fourth pattern of black dots is almost always used, for technical reasons that do not affect the principles of halftoning.)

Within each color separation, the size of the dots (in relation to their background) is proportional to the amount of the primary color in the composite shade. When the separations are combined, typically by overprinting in registration, they create the illusion of shades of color. The cyan, magenta, and yellow dots cannot be distinguished when viewed from a distance—instead, the pattern of color dots appears to be an area of a shade of color.

5.4.1 Dots, halftone cells, and screens

The dots that this section has discussed are the visible part of halftoning and most halftoning can be described in terms of patterns of these dots. The industry-standard terms used to describe the organization of these dots into manageable structures are *halftone cells* and *screens*.

Each dot is considered to occupy a *halftone cell*. (Figure 5.4 shows two groups of four halftone cells.) Every halftone cell is used to represent a gray level or color intensity. A dot can have any area in the range 0% of the area of the halftone cell (a completely white cell) through 100% of the area of the halftone cell (a completely black cell). Dots of intermediate areas create the illusion of gray levels. The number of pixels in the halftone cell defines how many intermediate areas of dot are possible and, in most systems, this defines the number of reproducible grays.

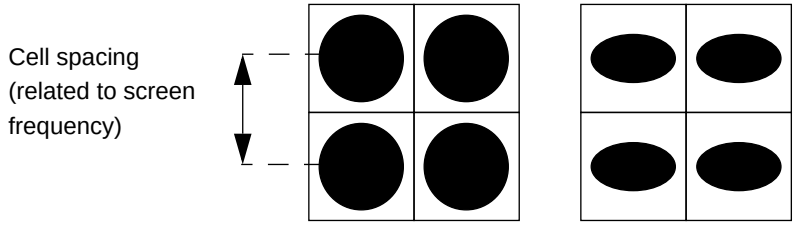


Figure 5.4 Halftone cells, screen frequency, and dot shapes

A *screen* is an invisible grid that is superimposed on the image—each square in the grid is a halftone cell. For a particular dot shape, the important characteristics of a screen are its spatial resolution, referred to as *screen frequency*, and the *screen angle* (as shown in Figure 5.5).

Screen frequency is the number of halftone cells per inch or centimeter. The corresponding units are lines per inch (lpi), lines per centimeter (lpcm), or lines per millimeter (lpmm). For example, a screen frequency of 100 lpi means halftone cells spaced every hundredth of an inch.

Screen angle is the angle between one side of the halftone cell and an axis on the output device (not a fixed axis on the page): the reference axis is usually the direction of the slow scan. The screen angle becomes important when you are combining the separate patterns of dots used for color reproduction. The most important consideration is the angular separation of the different screens, not their absolute angles relative to the device axes.

Note: For most screens, you can use the box **Rotate screens according to page rotation** in the Edit Style dialog box to maintain screen angles relative to the page axes. This may help you diagnose the cause of problems with patterning in the output.

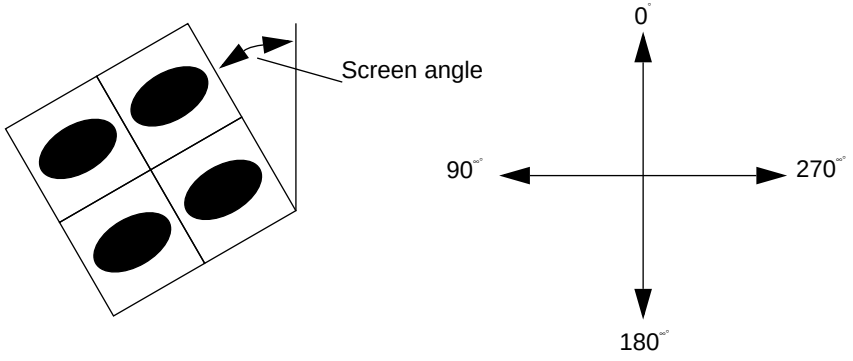


Figure 5.5 Halftone cells and screen angle

5.4.2 Dot shape

The choice of the shape of each dot that is generated in a halftoned image is essential to the quality of the eventual image. Figure 5.4 shows circular and elliptical dots, but dots can have other shapes and need not even form a connected shape within the halftone cell. Indeed, there are screens where the black pixels are distributed (*dispersed*) around the halftone cell without being joined into one dot. The way in which pixels are produced physically makes it difficult to manage dispersed pixels, though Harlequin Dispersed Screening (HDS) exploits this effectively to produce a less prominent pattern in the output.

There are two common ways of producing dot shapes: spot function screens and threshold screens. Both kinds of halftone work by telling the RIP which pixel within a screen cell to mark next to obtain the next darker gray level.

The Harlequin RIP supports all the screen types defined by *The PostScript® Language Reference Manual* (2nd Ed) and the non-proprietary types added in *The PostScript® Language Reference* (3rd Edition). This means support for `HalftoneType` values of 1 through 6, 10, and 16.

Note: If you create a Separations style using Eclipse Release SP1, and you decide to change the Dot Shape used, if both the original and new Dot Shapes are genuine Spot Functions (such as changing from `Euclidean` to `Square`), the screening settings remain as set, that is, they are not reset to the default values.

If however, either or both the original or new Dot Shapes are a Halftone Dot Shape (such as an HDS dot shape), the screening settings, such as the screen angles, and the Yes / No Print? values are reset to their defaults. The default values are defined in the Screen Names file.

Note: Screen Names files created with the Eclipse Release or later RIPs are incompatible with previous versions. That is, you cannot transfer a Screen Names file from pre Eclipse Release RIPs to Eclipse Release or later RIPs.

5.4.3 Spot function screens

Spot functions describe the dot shape using a mathematical function which, given the position of a pixel within a halftone cell, produces a number which says where in the sequence of pixels that pixel should be marked. This technique is very flexible, because it allows a single function to define a halftone cell at any size or angle.

In the Harlequin RIP the common dot shapes are provided by spot function screens. This means that all the screening options in the Edit Style dialog box are available, including the benefits of using Harlequin Precision Screening (HPS).

5.4.4 Threshold screens

As an alternative to a spot function screen, a threshold screen describes a halftone to the Harlequin RIP by providing the order in which to mark pixels explicitly in a table. The table has as many entries as there are pixels in the halftone cell.

A consequence of this is that a threshold screen is always defined in terms of a fixed cell size in pixels, whereas a spot function can be applied to arbitrary sizes of screen dot. This means that the screen cell for a spot function will occupy more pixels, but the same physical area on the output, if either the resolution is increased or the frequency (number of halftone cells per device

independent unit distance) decreased, but a threshold screen will get physically smaller and its frequency increase if the resolution is increased.

A further consequence is that HPS and other techniques which vary the actual pixels of a screen cell cannot be applied to threshold screens. On the other hand, threshold screens can be controlled very precisely, pixel for pixel, and are therefore suitable for describing Frequency Modulated (FM) screens if the cell is large enough. While threshold screens *can* be used to describe conventional "clumped" dots, they are less flexible because of their resolution dependence and absence of rotation to a specified angle (at least in their simplest form). Neither kind of screen is suitable for describing non-tessellating screening techniques, such as error diffusion.

The PostScript language offers several variations on threshold screens, which allow greater or lesser control over the sizes of the tables involved and the tessellation of the tiles (equivalent to the "angle") in a spot function.

There are no threshold screens in the standard set supplied with the RIP but it is possible to use threshold screens embedded in a job, or installed in the RIP by your supplier.

5.4.4.1 Using threshold screens

In the Edit Style dialog box, when you have selected a threshold screen in the **Dot shape** list and **Override dot shape in job** is selected, the following options are not available:

- **Frequency**
- **Override frequency in job**
- **Angles** (for all process and spot colors)
- **Override angles in job**
- **Use Harlequin Precision Screening**
- **Rotate screens according to page rotation**

Note: If you clear the **Override dot shape in job** check box, these options are enabled, so that you can override some parameters of spot function screens supplied in the job.

For more details of these options, see Section 5.5 through Section 5.7, and Section 5.10.

5.4.5 Halftone options

The Harlequin RIP provides a number of options to control halftone generation. Using them appropriately can improve the quality of your image, depending on the output device, media, and resolution used. You can also override any screening parameters that might be specified within the page description itself.

These are the three main features that are affected by the halftone strategy you choose:

- The shape of the dots created. See Section 5.6, “Dot shapes”, for the relevant controls.
- The frequency and angle of the dot pattern created. See Section 5.7, “Halftone frequency”, on page 228, for the relevant controls.
- The accuracy of the screens generated. There is no general way of controlling accuracy. One way of getting good accuracy is to use Harlequin Precision Screening (HPS), described in Section 5.10, “Harlequin Precision Screening”, on page 236.

5.4.6 Dot gain

When a halftone image is printed, the ink used to create each dot tends to flow outwards as it is absorbed by the paper. This phenomenon is known as *dot gain*. Similarly, dots printed on a laser printer tend to spread outward when the toner is bonded to the paper. As a result, any printed dot tends to be larger than the calculated dot size.

Dot gain can affect the quality of printed images. For example, if there is a significant amount of dot gain, images tend to appear too dark. For more details, see Chapter 10, “Calibration”.

5.4.7 Suggested background reading

If you do not have a reasonable grounding in halftoning systems then you may find the following books helpful. This is by no means an exhaustive list

and you can probably find alternatives in a good book store or technical library.

Real World Scanning and Halftones (David Blatner & Steve Roth, Pub: Peachpit Press, Inc., ISBN: 1-56609-093-8)

> If you ignore the fact that the authors are very insistent that the PostScript language can only produce 256 gray levels, then this is an excellent introductory text for PostScript halftoning.

PostScript™ Screening: Adobe Accurate Screens (Peter Fink, Pub: Adobe Press, ISBN: 0–672–48544–3)

> A very good introduction to digital halftoning, which then continues into discussion of process work and advanced screening techniques. Some of the book is specific to Adobe Accurate Screens™, but many of the concepts are common to HPS as well. This book also has an interesting section on factors affecting device calibration and other causes of poor film and press output.

An Introduction to Digital Color Prepress (AGFA Corporation)

> This booklet was produced to sell Agfa imagesetters, but many of the ideas discussed are common to all digital halftoning systems.

Electronic Color Separation (Dr. R.K. Molla, Pub: R.K. Printing and Publishing, ISBN: 0–9620453–0–6)

> This book refers to analog color scanners and does not discuss digital halftoning. The example scanning systems are somewhat dated, but the halftone concept has not changed since the book was written.

5.5 Screen angles

The Harlequin RIP offers you complete control of screen angles for both process and spot colors. There are a number of reasons for choosing screen angles carefully:

- A long-established reason for choosing the screening angles (and frequencies) of color separations has been to pick a set of values that minimize inaccuracies in the screens and consequent *moiré* patterning when they are superimposed.

  This reason is becoming less important as the accuracy of screen generation increases. For example, the RIP includes Harlequin Precision Screening (HPS), a technology that provides more accurate screening and reduces *moiré* without unduly limiting the choice of screen angle and frequency. See "Harlequin Precision Screening" on page 236 for details.

- You may wish to override a set of angles requested in a job. This is especially useful if the job has requested a set of angles that optimize the output quality for a particular output device, such as a laser printer, but that may diminish the quality on other devices, such as an imagesetter.

- You may want consistency: for example, on all pages of a single publication when the jobs come from different sources. Enforcing settings in the RIP is the simplest way of getting such consistency.

A good choice of angles for general use with color separations in offset litho work is a set in which the colors are separated by 30˚, for example: 15˚, 75˚, 0˚, and 45˚ respectively for CMYK (and related sets using these angles plus or minus multiples of 90˚). For use with elliptical dots, a separation of 60˚ is recommended, leading to angles of 15˚, 75˚, 0˚, and 135˚ for CMYK.

Note: The angles shown in the Edit Style dialog box (shown in Figure 5.2, page 213) always take effect for jobs that contain no screening requests. If the job attempts to set screening, you must select the **Override angles in job** check box if you want to use these values.

5.5.1 Changing angles for separations

The list of separations shows all colorants (including the standard process colors and any spot colors) and their screen angles.

The boxes below the list of separations allow you to control the printing of process color separations, and change the screen angles.

Note: From the Eclipse Release of the Harlequin RIP ink types are decided using the Ink Set Manager which is only available when one of the TrapPro options are enabled. See the documentation supplied with TrapPro for more information.

If the chosen output format supports additional colorants, you can also control the printing of spot color separations. Any spot color not explicitly listed is controlled by the `(Other colors in job)` settings. With the default settings, if a job calls for spot colors not named in the list of separations, the RIP converts those spot colors to the appropriate combination of process colors.

To change the settings for a particular colorant, select the colorant from the list and edit the values in the boxes below. To change the screen angle, type the new value in the **Angle** text box. For details of the other options, see Section 11.7, “Edit Style dialog box” on page 439.

Note: The **Angle** column and text box are both blank when the selected **Dot shape** does not have a controllable angle. Typically, this is because the dot shape belongs to a threshold screen (which does not have a conventional angle) or because the screening is being done in an output plugin or hardware device.

Each colorant has its own screening angle, which allows you to avoid *moiré* problems when a job has several spot colors used in duotone combinations with each other or with the standard process colors.

The angles shown in the Edit Style dialog box always take effect for jobs that contain no screening requests. If the job attempts to set screening, you must select the **Override angles in job** check box if you want to use the values shown in this dialog box.

5.6 Dot shapes

Manipulating the dot shape generated can greatly influence the amount of dot gain in an image.

The Harlequin RIP offers a variety of dot shapes; your choice between them might depend on the output device, resolution and media used, and the type of image. Dot shapes are controlled from the **Dot shape** pop-up menu, which is one of the screening options in the Edit Style dialog box.

Depending on the output device that you choose, you may see different entries in the **Dot shape** list. Output plugins can modify the contents of this list, either to add screens suitable for the output device or to remove the names of inappropriate dot shapes.

Note: The PostScript language allows you to specify an arbitrary dot shape by defining a spot function. This offers great flexibility but there are some possible problems as outlined in the *The PostScript® Language Reference Manual* (2nd Ed). One probable consequence of having a spot function defined in the PostScript language is slower rendering of jobs using that spot function: it is almost always preferable to use a dot shape provided by a RIP in place of one implemented in the PostScript language. The RIP includes efficient implementations of many commonly used dot shapes to offer both speed and choice.

Jobs often specify their own dot shape. To force the RIP to use your chosen dot shape instead, select the **Override dot shape in job** check box.

A *Euclidean* dot-shape strategy produces better saturated grays at gray values above 50%, especially at finer (higher) screen frequencies. Euclidean strategies increase the fill of halftone cells from the corners, instead of the centers, when the gray value exceeds 50%. That is, when the gray value is less than 50%, the dots are black, the background is white, and the dot size increases as the gray value increases; when the gray value reaches 50%, the dots become white, the background becomes black, and dot size decreases as the gray value increases.

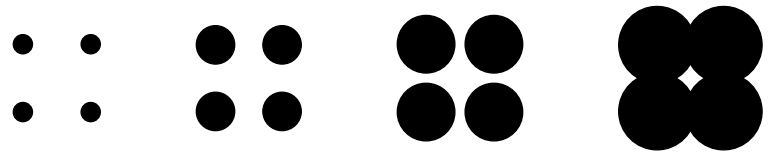
5.6.1 Common dot shapes

Sections 5.6.1.1 through 5.6.1.4 describe a number of commonly used dot shapes.

5.6.1.1 Round

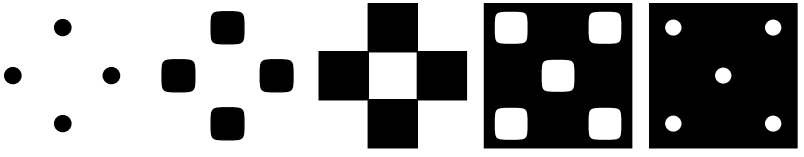
This is a commonly used dot shape, but dot gain can be a problem in the shadow areas, since the white diamond at the center of four adjoining circles can easily become filled with black as the dot size grows. However, round dots give a smooth appearance in the highlights and middle tones.

To use round dots, choose Round from the **Dot shape** pop-up menu.



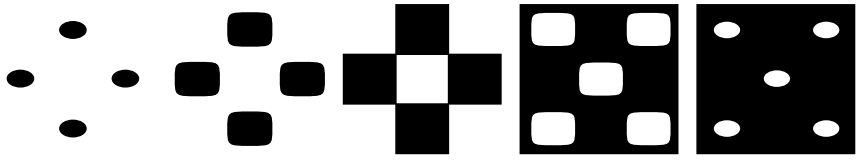
5.6.1.2 Round Euclidean

This dot shape reduces dot gain in the shadow areas and is good for general-purpose use. (It is common in newspaper production, for example.) To use round Euclidean dots, choose Euclidean from the **Dot shape** pop-up menu.



5.6.1.3 Elliptical Euclidean

This dot shape is used to avoid a fairly sharp transition at around 50% that can occur with the round Euclidean dot shape with some imagesetters. To use it, choose EllipticalP from the **Dot shape** pop-up menu. This is an excellent dot shape for general use.



A variant of `EllipticalP` is `Elliptical1`.

Note: The CMYK screen angles used for all elliptical dot shapes must be 60 degrees apart, instead of the normal 30 degrees. This is because of the asymmetry of the elliptical dot.

5.6.1.4 HDS, HMS, and HCS

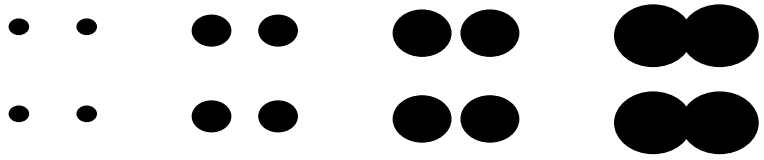
Global Graphics has developed a number of special screening strategies to provide better quality, control, and performance than standard forms of screening. These are not supplied with the Harlequin RIP by default, but may be purchased separately. For details of Harlequin Dispersed Screening (HDS), Harlequin Micro Screening (HMS) and Harlequin Chain Screening (HCS), see Section 5.11 on page 245 describing the Harlequin Screening Library.

5.6.2 Other dot shapes

The dot shapes in this section are mostly used only for special effects or purposes; for general purpose use, the shapes in “Common dot shapes” on page 224 tend to be better.

5.6.2.1 Elliptical

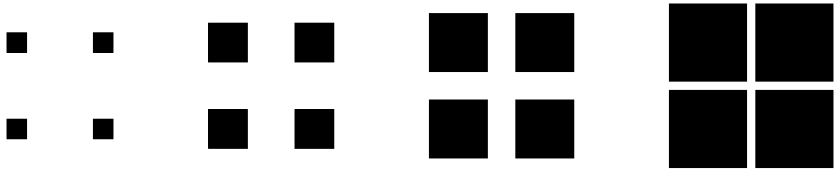
Elliptical dots generally produce a smoother transition than round dots, because the ellipses initially intersect only along one axis, though this can produce a lined effect. To use an elliptical dot shape, choose `Elliptical1`, `Elliptical2`, `EllipticalQ1`, or `EllipticalQ2` from the **Dot shape** pop-up menu.



Note: As mentioned for Elliptical Euclidean, the screen angles used for all elliptical dot shapes must be 60 degrees apart, instead of the normal 30 degrees. This is because of the asymmetry of the elliptical dot.

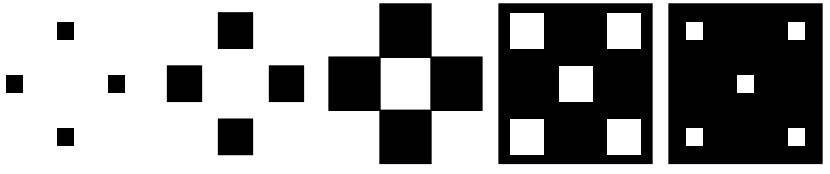
5.6.2.2 Square

Square dots are rarely used, except for particular effects. Images produced with square dots tend to have dot gain problems, particularly in the shadow areas. To use the square dot shape, choose `Square2` from the **Dot shape** pop-up menu.



5.6.2.3 Square Euclidean

Another form of square dot shape. To use square Euclidean dots, choose `Square1` from the **Dot shape** pop-up menu.



5.6.2.4 Rhomboid

This dot shape is very similar to the square Euclidean shape, but generally gives a somewhat smoother result. You should consider using it instead of the square dot shape. To use this dot shape, choose `Rhomboid` from the **Dot shape** pop-up menu.

5.6.2.5 Line

Line-shaped dots are generally used only to produce special effects, since there tends to be a lot of dot gain. To use the line dot shape, choose `Line` or `Line90` from the **Dot shape** pop-up menu.

5.7 Halftone frequency

Another way to improve the quality of halftoning is to increase the *halftone frequency*, the density with which the image is covered by halftone cells. Increasing the frequency is rather like increasing the resolution of an image: more dots are produced and each dot is smaller. However, the more you increase the frequency, the fewer gray levels you can print. Section 5.8, "Screening options and number of gray levels", discusses how many gray levels you can obtain and how many are required for various types of graphic elements. See also Section 5.10.1, "Controlling extra grays in HPS", on the extra grays feature available when using Harlequin Precision Screening (HPS).

5.7.1 Changing the halftone frequencies

In the Edit Style dialog box there is a list of halftone frequencies: one for each device resolution, or for a range of resolutions. The list of available resolutions depends on the chosen output device. The RIP uses the frequency that corresponds to the resolution selected in the Edit Page Setup dialog box. The con-

trols below the list allow you to change the frequency for the selected row, and to change the frequency and resolution units.

To change the halftone frequency for a particular resolution, or range of resolutions, select the row in the list and type the desired frequency into the text box below. You can change the units for the resolution to dots per inch (dpi), dots per centimeter (dpcm), or dots per millimeter (dpmm). You can change the units for the frequency to lines per inch (lpi), lines per centimeter (lpcm), or lines per millimeter (lpmm).

Sometimes the job itself specifies a screen frequency to use when rendering. If this is the case, the halftone frequency you specify in the Edit Style dialog box is ignored. To force the RIP to use your screen frequency instead, select the **Override frequency in job** check box. Always consider selecting this box if you use HPS. (See Section 5.10, “Harlequin Precision Screening” on page 236.)

5.8 Screening options and number of gray levels

It is an occasional requirement to know, and possibly control, the number of gray levels produced on a rendered page.

5.8.1 How many gray levels can you see?

Many studies have been published explaining just how many gray levels the human eye can distinguish, or how many levels a printing press can produce from halftones. The results vary from around a hundred to over a thousand depending on defined viewing conditions and the exact definition of what constitutes a distinguishable difference. The most worrying aspect of these studies is that most of them are correct—under the circumstances in which they were carried out, they determined the right result. The only thing to do at this stage is to throw away such studies and build on observations of real-world printing.

5.8.2 How many gray levels do you get?

Conventional screens can produce a maximum number of gray levels linked to the resolution of the output device and the screening frequency.

If you do not enable extra grays you get as many gray levels as the number of laser spots in a halftone cell (plus one for all spots off—that is, white). This number is given by the expression:

$$\left(\frac{\text{resolution}}{\text{screen frequency}}\right)^2 + 1$$

Thus at 100 lines per inch (lpi) and 2540 dots per inch (dpi) you get 646 gray levels …

$$\left(\frac{2540}{100}\right)^2 + 1 = 646$$

… but at 175 lpi and 1270 dpi you get only 53 gray levels:

$$\left(\frac{1270}{175}\right)^2 + 1 = 53$$

If you switch on **Generate extra gray levels** in the Edit Style dialog box then you get as many gray levels as you define with the **Limit number of distinct gray levels** pop-up menu. It is a feature of HPS that the number of levels can exceed the maximum defined in this expression.

Some RIP screening options do not follow this expression:

- Harlequin Precision Screening (HPS) is able to produce more gray levels than predicted by the conventional expression.
- HDS does not have a conventional frequency to apply in the expression—though it is possible to establish a rough correspondence between each HDS setting and a conventional screen of a particular frequency at a particular resolution.

5.8.3 How many gray levels do you need?

The number of grays you need depends on what you are trying to produce. Some types of images with varying needs for number of gray levels are:

- Flat tints
- Contone scans
- Graduated tints and blends

Images vary within these categories, but the following discussion of each category should show you the principles to apply in judging how many grays are needed.

5.8.3.1 Flat tints

If you are using a few flat tints behind text or in a simple diagram then you may not need more than a dozen gray levels. Do not enable extra grays in the RIP solely to reproduce flat tints.

5.8.3.2 Contone scans

If you are using a small desktop flat-bed scanner that is producing contone images for output then you are usually able to work with output producing as few as 64 gray levels. A few scans may benefit from up to 128 gray levels—and the distinction is usually as much to do with which desktop scanner you are using as with the image content. In general, images with very gentle tonal or color graduations (for example: a cloudy, but not stormy, sky) need the most gray levels, but even in these cases the best 6-bit (64 gray levels) scanner can produce better output than many 8-bit (256 gray levels) competitors.

For scans made on a drum scanner or a high-quality flat-bed scanner, you can usually obtain adequate output with this low number of gray levels, but the quality of the output normally increases with up to 256 gray levels. Several scanners are available which produce 10, 12, or even 16-bits-per-channel image data, and it is possible that you can increase the output quality of these images by allowing more gray levels on output—PostScript LanguageLevel 3 includes the facility for 12-bit-per-channel images to be output (4096 gray levels), and this is supported in the Harlequin RIP. The increased number of gray levels from the scanner is intended more to allow input noise to be removed, and to reduce the information loss inherent in tonal adjustment, than for passing on to the final output device.

Finally, any image manipulation software that produces some of its tonal alteration effects by means of the PostScript-language operator `settransfer` (or any similar mechanism) and which therefore ends up requesting a nonlinear gray scale from the RIP may require an increased number of grays to reflect these changes adequately. Although applications such as Adobe Photo-

shop allow transfer functions to be saved in EPS files, they apparently intend this for device linearization rather than for tone curve control.

Note: Adjusting tonal data in image manipulation software often benefits from an original scan with as many levels of gray as possible to reduce quantization effects when changing brightness or contrast, but this does not directly affect the number of gray levels that are required from the output device.

5.8.3.3 Graduated tints and blends

It is in these areas that the requirement for extra gray levels really shows. To avoid confusion, the word *vignettes* is used here to cover both graduated tints and blends.

The minimum number of gray levels required is 256, but some long vignettes, or those over a relatively short range of tints, may require more. The rule of thumb is that no single step in a vignette should be more than 0.03 inches (0.75 mm) wide.

Thus a vignette from 20% to 70% tint that is 6 inches long requires at least 400 gray levels:

$$\frac{100}{(70-20)} \times \frac{6}{0.03} = 400$$

This rule varies with the screen frequency that you are using, with the particular tint range (because steps are most obvious in dark graduations), with the hardness of the dots produced by the output device and with the size of the difference in gray levels between steps, but it serves very well as a basic starting point. Because of the variation with the size of the difference in gray levels between steps it is very unlikely that you should ever require more than 1024 gray levels, and in many instances 512 or 256 levels are sufficient.

If you are producing blends in applications such as Adobe Illustrator® or FreeHand® (formerly from Aldus, now Macromedia) then you should make sure that you create blends with enough steps—the RIP cannot add more steps into the blend. You may also need to use switch on extra grays and use Harlequin Precision Screening with its ability to exceed the conventional limit of gray levels in order to display all the requested gray levels.

Graduated tints from many older applications do not produce more than 256 gray levels:

- Some applications always produce 256 grays for a 0 to 100% graduation. Examples are FreeHand and QuarkXPress® (version 3.11 and later) when printing to a PostScript LanguageLevel 2 compatible device.
- Some always produce 256 gray levels in a single blend, even a short one such as 10% to 30%. An example is QuarkXPress version 3.1.
- Some calculate the number of gray levels which the current resolution and screen frequency could produce on a RIP that does not support extra gray level functionality and use that. Examples are FreeHand and QuarkXPress (version 3.11 and later) when printing to a PostScript LanguageLevel 1 compatible device.

In the first two cases it may be worth switching on extra gray levels in the RIP if you are using a low resolution or a fine (high frequency) screen. In the last case you gain no benefit by switching on extra grays.

5.8.4 Gray level controls

There are two screening options in the Edit Style dialog box shown in Figure 5.2, page 213, that affect the number of gray levels.

These options are applicable to any screen, especially HDS, to limit the number of available gray levels. (For HPS only, the number of levels can also be increased to more than the natural number of levels for the screen.)

Limit number of distinct gray levels

When you have selected the accompanying check box **Generate extra gray levels**, described next, you can choose an entry from list to control the number of gray levels that the RIP produces. There are several different cases.

With this menu enabled:

- When using HPS, the RIP produces the exact number of gray levels set here.
- When not using HPS, the RIP treats the value chosen here as an absolute upper limit and uses the natural value of the screen or this limit, whichever is lower.

This menu is disabled when **Generate extra gray levels** is not selected. With this menu disabled out:

- When using HPS, the RIP produces the number of gray levels required to attain the specified accuracy of screening, as set in the HPS Options dialog box, shown in Figure 5.6, page 237.
- When not using HPS, the RIP produces the natural number of gray levels for the screen. (For HDS, the natural number can be very large and using HDS unlimited can have a performance penalty.)

Generate extra gray levels

There are two possible reasons for selecting this box:

- With all Harlequin RIP screening options, it enables the use of the **Limit number of distinct gray levels** to restrict the number of gray levels produced on the output page.
- With HPS only, it enables the use of more screening levels than needed to get the required accuracy of screen angle and frequency. Generating a large number of screening levels can reduce undesired patterning, even if the number of levels actually used is restricted by the value chosen for **Limit number of distinct gray levels**. See Section 5.10.1 on page 236 for the control of extra screening levels in HPS.

5.9 Job settings and Harlequin RIP settings

The details of how you can choose settings for dot shape, frequency, and angle are given in, respectively, Section 5.6 on page 224, Section 5.7 on page 228, and Section 5.5 on page 222. These sections also describe how to override any conflicting settings made in a job.

The following summary of what happens when the Harlequin RIP processes a job may be useful.

The RIP determines the screen or screens it will use for a job using the values in the Edit Style dialog box, and the color of the pages being processed:

- Monochrome jobs use the gray settings.
- The color of pages in preseparated jobs is deduced by a variety of means, as described in Section 5.12 on page 254.

  Note: Some jobs which have preseparated spot color pages do not contain any information about the name of the spot color they represent. In these circumstances, the RIP uses the screening angle that corresponds to the (`Other colors in job`) entry.
- Colors of pages are determined from settings in the Edit Style dialog box.

When a job supplies any screens of its own (using the `setscreen`, `setcolorscreen`, or `sethalftone` operators) then if the override check boxes in the Edit Style dialog box are all cleared, the RIP uses the frequency, angle, and dot shape of the supplied screen until the job provides another screen or cancels any screens it has supplied.

However, if the **Override frequency in job** check box is selected in the Edit Style dialog box the RIP continues to use the frequency given in the dialog box instead of the one supplied by the job. Similarly, if **Override dot shape in job** is selected, the RIP ignores the dot shape supplied by the job and uses the one given in the dialog box instead, and if **Override angles in job** is selected, the RIP ignores any angles given by the job in favor of those in the dialog box.

If all three boxes are selected, all screens given by the job are effectively ignored.

If you are using HPS, the frequency and angle values are also subject to slight adjustment to achieve accurate screening. See Section 5.10.2 on page 237 for details of how to limit any adjustment.

Note: HDS screens do not have a conventional screening frequency or angle and ignore the frequency and angle settings. HCS uses a fixed set of angles, so it also ignores the angle setting.

5.10 Harlequin Precision Screening

When placing color separations on top of one another, the angles and frequencies at which those separations are produced should be calculated very accurately so as to reduce *moiré* patterns. Historically, this required the use of specially selected screens that minimize the patterning effect.

Harlequin Precision Screening (HPS) is a color screening technology that ensures high-quality reproduction with any screening option in the RIP (defined using a spot function). You can enable HPS for a separations style by selecting the **Use Harlequin Precision Screening** check box in the Edit Style dialog box. Once enabled, HPS is a property of the page setup which uses this separations style, and the RIP uses HPS for all pages printed with that page setup.

HPS allows you to select any screen frequency and to use the usual CMYK screen angles of 0˚, 15˚, 45˚, and 75˚ (plus multiples of 90˚). To reduce *moiré* patterning, HPS uses an adaptive screening technique that can adjust each halftone dot so that it is placed within one half pixel of its *ideal* location.

HPS also allows you to choose how rosettes are formed in the image, and to generate extra gray levels, allowing the use of higher screen frequencies than the resolution would normally allow.

The default HPS settings supplied with the RIP have been carefully chosen to provide good output on most, if not all, output devices. We strongly recommend that you test output using the default settings (in the HPS Options dialog box) before adjusting anything at all. The information in Section 5.10.3, “Possible problems with output” on page 241, is intended to help in adjusting values if you think that it is necessary.

5.10.1 Controlling extra grays in HPS

The ability to generate extra gray levels is a very powerful feature of HPS. It allows you to use more gray levels in your job than are normally available with conventional screening. This has particular benefits in eliminating stepping in vignettes and avoiding posterizing.

“Gray level controls” on page 233 describes the use of the gray level controls in the Edit Style dialog box, including the effect of switching on or off HPS.

There is one extra option within HPS.

The extra option, **Limit screen levels**, in the HPS Options dialog box allows you to separate pattern-reduction adjustments from extra gray generation—set the **Limit screen levels** value to a high value and **Limit number of distinct gray levels**, in the Edit Style dialog box, to the number of gray levels that you actually require. If you see patterning on individual films, try increasing the **Limit screen levels** value: if you believe that there is a shortage of memory, then reduce the value.

5.10.2 Using the HPS controls

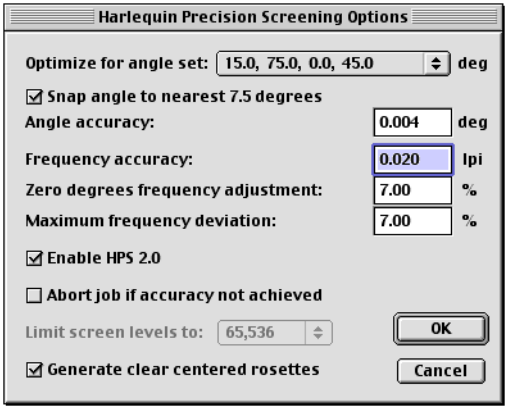


Figure 5.6 Harlequin Precision Screening Options dialog box

Section 5.9 on page 234 describes how the RIP arrives at a set of screening values for a job.

When using HPS, for each screen in a job, the RIP calculates the best set of screen angles and frequencies to use for the set requested. The process starts with the requested frequency—the frequency set in the job or, when **Override frequency in job** is selected, the value in the Edit Style dialog box. The Edit Style dialog box contains a list of halftone frequencies: one for each device resolution. The requested frequency is the one that corresponds to the resolution selected in the Edit Page Setup dialog box.

Some requested frequencies may require a lot of memory or make it difficult to achieve the desired angle accuracy, while a nearby frequency does not have

these problems. If there is a problem with the requested frequency, the RIP can select one of these nearby frequencies as the deviated frequency.

The **Maximum frequency deviation** specifies the greatest deviation from the requested frequency that is allowed. The RIP selects the individual frequencies for the Cyan, Magenta, and Black screens such that they are within the specified **Frequency accuracy** away from the deviated frequency.

The angle is snapped to the nearest 7.5° if you select **Snap angles to nearest 7.5 degrees**.

The angles of the selected screen set are then within the specified angle accuracy of the requested angles.

The following subsections describe some individual options in more detail.

5.10.2.1 Zero degrees frequency adjustment

Once the RIP has calculated a screen set for the Cyan, Magenta, and Black plates (as separations or composite channels within the RIP), it determines the frequency of the Yellow plate using the value specified for **Zero degrees frequency adjustment**. The identity of the Yellow angle is determined either from the color halftone dictionary supplied to the `setscreen` or `sethalftone` PostScript-language operator, or is taken as the third entry in **Optimize for angle set**.

The default value of 7% means that the frequency of the Yellow plate is 107% (100% + 7%) of the deviated frequency used for Cyan, Magenta, and Black plates.

A number of printers have discovered that increasing the frequency of the Yellow plate can reduce the residual *moiré* that is inevitable when using four process plates with halftoning systems. Values typically used are 5% to 11% greater than the frequency of the other plates. The effect is very similar if the frequency of the Yellow plate is reduced rather than increased, and that this allows the more noticeable Cyan, Magenta, and Black plates to be imaged at a higher frequency when the capability of the plate-maker / paper / ink / press combination is the limiting factor on halftones.

Enter a negative number to reduce the frequency used for the Yellow plate.

5.10.2.2 Maximum frequency deviation

Increasing the value in the **Maximum frequency deviation** box gives the RIP more freedom in finding an optimal screen set and can reduce patterning or *moiré*, at the expense of possibly giving final output at a screen frequency further from that originally requested. A value of between 5% and 10% is normally acceptable.

Increasing the **Angle accuracy** or **Frequency accuracy** settings (that is, increasing allowable variations from the deviated frequency and angle) also gives the RIP more freedom in selecting a screen, and may reduce patterning on individual films, but this may also *increase* the likelihood of *moiré* effects between plates. If you are using HPS to produce extra grays on mono or non-overlapping spot color work then you can safely increase these numbers and may obtain slightly better output. If you are producing process separated work then you should probably not change the default numbers.

If **Abort job if accuracy not achieved** is selected and it is not possible to determine a screening set within the angle accuracy or frequency accuracy requested, then the RIP cancels the job currently being output.

5.10.2.3 Enable HPS 2.0

Select the **Enable HPS 2.0** box to use features added to HPS. These features can improve the quality of output when using the **Generate extra gray levels** option. Flat tints and vignettes are smoother, particularly in highlights and shadows, because the mottling effects which can be caused by generating the extra gray levels are reduced. (Even without HPS 2.0, these effects are unlikely to be significant until the ratio of resolution to screen frequency is less than 12: for example, you might see mottling with a resolution of 1270 dpi and a screen frequency of 150 lpi, where the ratio is about 8.5.)

5.10.2.4 Generate clear centered rosettes

Figure 5.7 Clear-centered and spot-centered rosettes

Generate clear centered rosettes is one of the few controls which you might expect to change in the HPS Options dialog box. When color separations are combined, the dots form one of two rosette patterns as shown in Figure 5.7. Clear-centered rosettes are less likely than spot-centered rosettes to show a significant color shift if separations are printed slightly out of register, but the output produced is normally less saturated, lighter, and has a more noticeable rosette structure. In general, output at high frequencies, or where the output may be run on presses with poor registration, should use clear-centered rosettes, while output at low screen frequencies or on well registered devices (including most color printers) should use spot-centered rosettes.

If you find that you are not getting consistent clear-centered or spot-centered rosettes across the full width of a page: try varying the requested frequency slightly; or increase **Maximum frequency deviation**, to allow the RIP to find a screen set with better angle and frequency accuracies.

5.10.2.5 Optimize for angle set

It is possible to reduce the amount of memory required by HPS if you can give some guidance to the software about which screen angle sets are to be used in PostScript-language jobs, in the **Optimize for angle set** text box. The default set (15, 75, 0, 45) is used for most offset litho work, while settings are also provided for other screening systems.

To decide which entry you should use:

1. Convert all the screen angles your job uses to numbers in the range 0˚ through 90˚. Do this by repeatedly adding 90˚ to any values less than 0˚ or subtracting 90˚ from any values of 90˚ or greater.
2. Compare the converted numbers with angles in the menu entries. There are three possibilities:
   - If you reach a set of values where all of the numbers are in a single entry in the menu then use that entry.
   - If the values do not match an entry exactly then select the closest match.
   - If there is no close match then select the default (15, 75, 0, 45).

5.10.3 Possible problems with output

There are two main kinds of problem to avoid with HPS output:

- Patterning on individual films.
- Patterning caused by the interaction of two or more films from separated output (often called *moiré*).

In addition there are practical considerations. You usually want your output to be produced as rapidly as possible, and you do not want to have to install excessively large amounts of RAM in the computer running the RIP.

The following subsections describe how to address these problems.

5.10.3.1 Patterning on individual screens

This can be caused either by the hardware or the software. If you see stripes or bands parallel to the output engine's scan lines (across the film on a capstan device, along it in a drum device), then try these cures:

- Rotate the page by 90 degrees.
- Select the check box **Rotate screens according to page rotation** in the Edit Style dialog box. (This check box does not affect HDS.)
- Output the page again.

If the bands rotate with the page, the problem can probably be corrected by adjusting settings in the RIP; if they do not, your hardware may be at fault.

If you are seeing patterning on individual films there are two techniques that you can try which may help to reduce the effect:

- Increase the number of screen levels generated. In the HPS Options dialog box, set a high number for **Limit screen levels**. The default value is 65536, which is the maximum value.
- Try slightly different screen frequencies—often a change of only a couple of lines per inch can make a considerable difference to the patterning.

5.10.3.2 Moiré between two or more films

Many people make the mistake of placing four process separated films on top of each other on a light table, and being horrified by the *moiré* displayed. *Moiré* is always visible if you view all four plates in this way. If you want a quick assessment of the *moiré* on a final print job, view just the Cyan, Magenta, and Black films. Adding the Yellow film as well can be useful in assessing variations in the marginal *moiré* added by the Yellow plate, but should not be included in your standard viewing.

Eliminate two other sources of *moiré* before attempting to tune HPS:

- If you are using a dot shape which is not symmetrical when rotated in 90° steps (that is, virtually all dot shapes apart from square and round) then all the screen angles used for cyan, magenta and black plates *may* need to be 60° apart rather than the traditional 30° apart. Yellow should then be at 30° from two of the screens. Suggested angles are 15°, 75°, 0°, and 135° for cyan, magenta, yellow, and black respectively. Whether you need to follow this suggestion or not depends on the content of the image (because flat tints in certain colors show *moiré* most clearly) and on how extreme the asymmetry of the dot shape is.
- Many older process separating applications (and newer ones using *PPD*s, *PDF*s, and so on to optimize for older imagers) include individual screen frequencies and angles for the four process colors which are designed to optimize output on older PostScript language compatible RIPs that are not capable of producing halftone screens at accurate angles and frequencies. Using these frequencies and angles means that the output from the RIP with HPS is no better than without HPS, and indeed may be far more prone to *moiré*.

  The best route is to switch off such features in the sending application if possible, or to set up a PPD (or other configuration file) which uses the same screen frequency for all separations, and a standard set of angles: for example, 0°, 15°, 45°, and 75°.

If modifying the input file is not possible then, in the HPS Options dialog box, select **Snap angles to nearest 7.5 degrees** and, in the Edit Style dialog box, select **Override frequency in job**. You cannot use this second method if you want several different screen frequencies on a page: for example, for special effects.

5.10.4 HPS and pattern screens

Some applications use the PostScript-language halftoning mechanism to produce patterns rather than halftones. However, devices which do not require screens would then reproduce the pattern as a shade of gray. Some applications which do this produce poor PostScript-language files, in such a way that they only produce the desired result at resolutions which are multiples of 75 dpi, presumably because they were designed for output at 300 dpi on a laser printer and not for high-resolution imagesetters.

To avoid these problems, the RIP detects such screens and replaces them either with a special screen which does not suffer from resolution problems, or with an equivalent PostScript-language pattern, depending on whether the output is halftone or continuous tone.

HPS does not alter these pattern screens in any way—angles, frequencies, and dot shapes are left unchanged and no extra gray technology is used with them.

5.10.5 Increasing HPS performance

The first time a RIP installation uses a particular HPS screen, the RIP must generate it. This can take a few minutes. However, HPS screen sets are cached to disk, which means that there is very little performance difference from using HPS if the RIP has a large enough memory allocation (and apart from the first time that a particular screen set is used, which is when the RIP builds the disk cache). There may be some performance increase when using screen caches generated during previous jobs.

The RIP caches screen sets with PostScript-defined spot functions as well as those with recognized functions. These spot functions are not processed quite as rapidly as the built-in functions the first time that they are used but when

previously cached screens are used there is no difference in performance between built-in screen functions and spot functions supplied in PostScript.

High performance screening with HPS in the RIP requires a reasonably large amount of RAM. As a guide, you should assume that extra memory in the range 8 through 12 MB RAM is required to use HPS effectively.

If messages are produced in the RIP Monitorwindow saying that insufficient memory is available and that performance is being affected then you should increase the amount of RAM available to the RIP to obtain significant speed increases.

If you are not using extra grays then increasing the freedom of HPS to select from a wider range of screen sets by increasing the **Maximum frequency deviation**, **Angle accuracy**, or **Frequency accuracy** settings reduces the memory requirement. If extra grays are switched on, you can also reduce memory usage by using lower values for **Limit number of distinct gray levels** and **Limit screen levels**.

Ensure that the **Optimize for angle set** value defined in the HPS Options dialog box is correct for the angles that you are using. If the value is set incorrectly then processing a job may require significantly more memory.

If you are imposing several separations onto one output film, the relative positions of the plates which do *not* use 0 and 45 degree angles (usually Cyan and Magenta) can make significant differences to memory requirements and rendering times. If at all possible, ensure that these two plates do not occur side by side: that is, avoid the case where a single fast scan line on the final film can pass through both a Cyan plate and a Magenta plate. If all four CMYK separations are to be produced on a single film then the best default configuration is a two by two square with Cyan and Magenta in diagonally opposite corners, because film rotation cannot then cause these plates to appear on the same scan line.

5.11 Harlequin Screening Library

Several other screen sets can be supplied for use in the Harlequin RIP. They comprise the Harlequin Screening Library (HSL).

The code to handle all of the screen sets is present in all shipped copies of the RIP, but individual screen sets must be enabled using key numbers (passwords). Each password is tied to both a specific screening style and to the serial number of the RIP for which the option is required. Please contact your supplier for details of pricing on each screen set or bundle of sets (and other options enabled by passwords).

Where the RIP itself is secured with a hardware security dongle the security number of the dongle is used as the Harlequin RIP serial number. Please note: the number printed on the dongle itself and marked as *serial number* is the dongle hardware serial number and *not* the same as the Harlequin RIP serial number.

While the RIP is starting up, it reports the serial number and its checksum (a check to reveal errors in copying the digits of the serial number) in the RIP Monitorwindow. This example report is for a fictitious serial number:

```
Serial number: 1234-56
```

5.11.1 Switching on HSL

You enter the passwords in a dialog box accessed from the Configure RIP dialog box. Click **Extras** in the Configure RIP dialog box to display the Configure RIP Extras dialog box.

There is one entry in the list within the Configure RIP Extras dialog box for each of the HSL screen sets. (There is a second entry for HDS, titled HDS-Light: this entry provides a limited use of HDS, restricted to lower resolution output devices such as proofing printers.)

There may also be entries which refer to options in other areas of the RIP: for example, ColorPro for the Harlequin RIP color management system. These entries are described elsewhere in this manual: see Section 6.8 on page 265 for a summary of other entries.

The word `Yes` after a name indicates that the screen set or option is enabled. To enable a new set or option, select it in the list and click **Add**. In the Enable

Feature dialog box that appears, enter the password supplied to you for that set, then click on **OK** to return to the Configure RIP Extras dialog box and **OK** again to return to the Configure RIP dialog box.

You can change a password already entered by selecting the appropriate entry in the list on the Configure RIP Extras dialog box and clicking on **Add**.

Note: To disable a feature that you have already enabled with a valid password, enter a password of `0` (zero).

The RIP may reject a password when you type it into the Enable Feature dialog box. The main reasons for rejection are:

- The password is wrong, probably because of incorrect transmission or a typing mistake.
- The password is for the wrong option. For example, if you enter an HDS password after selecting HCS then the password is not accepted.

The fact that the Enable Feature dialog box accepts a password does not necessarily imply that the password is correct for that particular screen set on that particular copy of the RIP. (Remember that the serial number of the Harlequin RIP is set by the dongle.) If you get errors when using an HSL screen, please check that the entered password is correct.

5.11.2 Selecting an HSL screen set

Once enabled, each screen set adds one or more entries to the **Dot shape** pop-up menu in the Edit Style dialog box. Select the entry for the screen you want to use.

Note: You can select a screen set in the Edit Style dialog box so long as the RIP has accepted a non-zero password entered in the Password dialog box. All attempts to use the screen will fail if the password entered is invalid for the the Harlequin RIP serial number currently in use.

5.11.3 Harlequin Chain Screening (HCS)

Harlequin Chain Screening uses a long ratio elliptical dot. When used for process color separations the angles used are 60˚ apart, rather than the more common 30˚ apart used for most offset litho work. This gives an overall triangular

pattern and produces a very fine rosette structure. The angles used are -45˚, 45˚, -15˚, and -75˚ for yellow, magenta, cyan, and black respectively.

When used at high frequencies, this screening set is extremely good at holding detail in continuous tone areas (for example, scanned images), but *can* suffer from worse object *moiré* than, for example, Euclidean dots if the subject of the image contains fine patterns.

HCS is also very good at creating smooth, flat looking tints in process color work even at low screen rulings, although you must take care at the edges of such tints, where patterns can occur unless the tints are bounded: for example, edged with a black rule.

For HCS screens, the RIP uses the screen frequency entered into the Edit Style dialog box, but ignores the entered angle. Instead, the RIP selects an angle automatically based on the color separation being processed, from the set (-45˚, 45˚, -15˚, and -75˚).

We recommend that you turn on Harlequin Precision Screening while using HCS—at higher frequencies, also use the extra grays functionality of HPS.

5.11.4 Harlequin Dispersed Screening (HDS)

Harlequin Dispersed Screening is the Harlequin RIP Frequency Modulation (FM) screening technology. The main advantages of using HDS are that it produces no *moiré*, it has better definition than conventional screening, and registration is less critical. HDS also has a visually pleasing screen structure and is generally more printable than other FM screens. Finally, it should be noted that HDS is intended for use with a wide range of printing processes.

Instead of using a fixed shaped *dot* structure, HDS uses irregular *clusters* of pixels to form an irregular *HDS dot*. The distribution of these dots or clusters through the screen is what gives HDS its characteristics.

Five varieties of HDS are supplied with HSL, called HDS Super Fine, HDS Fine, HDS Medium, HDS Coarse, and HDS Super Coarse. (There are also closely related HDS screens for use with output devices supporting the alter-

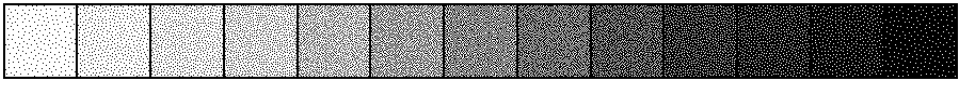
native process color systems discussed in Section 11.1.1 on page 423. For example, you may see `Hex HDS Super F` as well as `HDS Super F` in the **Dot shape** menu of the Edit Style dialog box.)

Warning: Do not use `Hex HDS Super F` or other screens whose names start with `Hex` when your output device is operating in a conventional (CMYK or RGB) output space. Several output plugins remove the names of inappropriate dot shapes from the **Dot shape** list to help prevent mistaken choices.

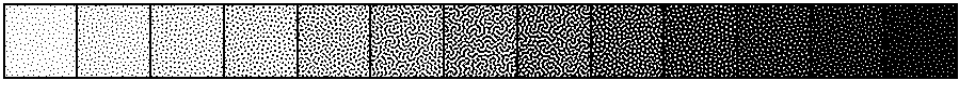
These varieties differ in the size and distribution of the HDS dots (clusters) used to create tints. The selection of which to use should be based on the physical characteristics of the imagesetter being used, together with details of the plate making, press, ink, paper, and press environment.

In general, the higher the quality of the entire printing process the smaller the HDS dot that can be used. The finer HDS screens are best used with high quality imagesetters capable of holding single laser spots. The coarser HDS screens are best selected on presses which cannot hold very fine detail, such as high speed web-offset presses. The physical size of the HDS dot created with each of these options varies both with the imagesetter laser spot size, and with the resolution at which it is driven. HDS Super Coarse (`HDS Super C`) is designed to be suitable for use in newsprint applications on imagesetters at mid-range resolutions, that is 1000 through 1600 dots per inch (dpi). HDS Super Fine (`HDS Super F`) is designed for output devices where final copy is produced directly: for example, laser or inkjet printers.

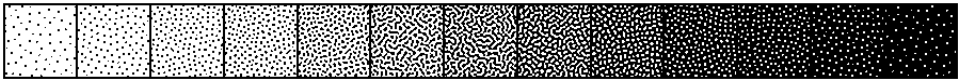
HDS Super Fine:



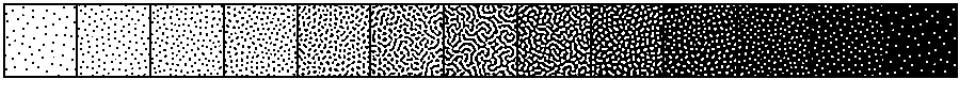
HDS Fine:



HDS Medium:



HDS Coarse:



HDS Super Coarse:

Below is a table with the spot sizes in microns for the different HDS models and different output resolutions for 20% HDS screen.

Imagesetter/platesetter resolutions dpi	1016	1200	1800	2400	3600
HDS Super Fine 1x1 pixel	25	21	14	11	7
HDS Fine 2x1 pixels	35	30	20	15	10
HDS Medium 2x2 pixels	50	42	28	21	14
HDS Coarse 2x3 pixels	61	51	34	26	17
HDS Super Coarse 4x4 pixels	100	84	56	42	28

Table 5.1 Spot sizes in microns of a 20% HDS screen

Both the frequency and the angle supplied in the Edit Style dialog box are ignored when using HDS screens, except for calibration.

As with any high definition screening technology, accurate calibration is important for good quality output using HDS, and it may be necessary to create several calibration sets for use with different presses or different paper stocks on a given press. In most circumstances however, a single calibration set is sufficient and you should therefore specify a range of frequencies likely to cover any line frequency which might be set in the screening dialog boxes

or requested by a PostScript-language job. The HDS screens are symmetric, that is, you may use a single calibration set for both positive and negative output.

Though HDS screens do not have the same lines per inch (lpi) characteristic as conventional screening the following rough comparisons may be useful. If we take the case of an imagesetter working at 1524 dpi with a relatively small dot size (less than 20 μm), then **HDS Coarse** has a dot gain on film only slightly higher than a conventional 150 lpi screen in the midtones, and holds up better than the conventional screen in the highlights and the shadows. **HDS Medium** has a similar correspondence to a 200 lpi screen at 1524 dpi. Finally, **HDS Fine** has characteristics similar to a 300 lpi screen, and needs similar careful handling to obtain good results. It should be noted that the lpi correspondence changes more or less in proportion to changes in the imagesetter resolution. For example, a rough correspondence to a 100 lpi screen is given by **HDS Coarse** at 1016 dpi, though if the final press has high dot gain this still has to be taken into account in the calibration.

As can be seen from the above comparison with conventional screening, many people using HDS screens may become aware of the issues required to print very fine detail on film for the first time. The following hints and suggestions are useful when working with HDS screens, particularly **HDS Fine,** and also apply to conventional and other screens at very high line frequencies. These hints are not a definitive guide, but do provide a starting point for producing good HDS output.

Consider every stage of the process, including:

- While scanning, choose an appropriate unsharp masking setting. You *may* need to use unsharp masking settings different from those used for conventionally screened output.
- When producing film positives, try using different laser spot sizes. We have found that the best results are produced if a relatively small laser spot size is used in conjunction with exposures sufficient to give solids with densities in the range 3.5 through 4.0. However, this may not be applicable to every imagesetter.

- When making plates and proofs, take great care to ensure that the film is clean and dust free and make any other adjustments that help to ensure intimate contact between the film and the proof or plate medium. For example, increase the vacuum pump-down time from, say, 20 seconds to 60 seconds or more.
- When printing on a press with relatively high dot gain, consider compensating for this gain. On such presses, particularly on web-offset, you may have to make an adjustment for the higher dot gain in the highlights and midtones due to the finer detail in the screen. Various schemes are possible and have been used for this; one approach is to calibrate the screen for the press directly, but be aware that images are normally scanned with a modest press compensation already in place and take this into account.

HDS screens have no angle as such, but are *rotationally isotropic* (they have the same characteristics in every direction). Even though the screen angle is ignored, different patterns are used for each process separation. This does not depend on the screen angle originally selected, but uses the automatic color separation detection, described in "Automatic detection of color separations" on page 254.

The screen caches used by HDS mean that HDS output is produced at virtually identical rates to that using other screening systems within the RIP. The caches are reasonably large, although not significantly greater than those used for many combinations of screen frequency, resolution, and angle. Do not select very large values for **Limit screen levels** in the HPS Options dialog box, unless you have very large amounts of RAM available to your copy of the RIP.

Unlike HPS, HCS, or HMS, the screen caches used by HDS cannot be created by the RIP if they are not present when a screen is selected. Each of the variants of HDS requires cache files to be installed into the `Screens` subfolder of the `SW` folder. These are saved in folders named in the pattern `HDS-<set>-gen`, where `<set>` is replaced by particular values. The `<set>` part of the name is `a` for super fine, `b` for fine, `c` for medium, `d` for coarse, or `e` for super coarse. Each folder has subfolders, named: `A`, `Ai`, `B`, `Bi`, `C`, `D`, `Default`, `E`, and `F`. These folders allow for up to six independent output colorants, including light and dark versions of two inks, and spot colors. For example, with a conventional four-color device, the mapping is that Cyan uses `A`, Magenta uses `B`, Yellow

uses C, and Black uses D. Installer applications supplied by Global Graphics for use with the RIP automatically install all appropriate cache files.

The RIP ignores the value set for **Rotate screens according to page rotation** (in the Edit Style dialog box) when screening with HDS.

Compression of page buffers is less efficient with HDS than other screening techniques. (It is a general rule of compression that increased randomness in data reduces the amount by which it can be compressed.) You can expect compressed page buffers to be larger when using HDS, and disk performance to become marginally more important to total throughput. It is usually possible to maintain or improve throughput with the same output quality, by exploiting the ability to process jobs at lower resolution.

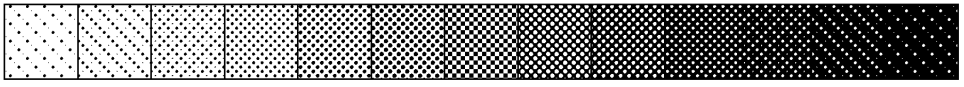
HDS screens cannot be used if the horizontal and vertical output resolutions selected are not equal.

5.11.5 Harlequin Micro Screening (HMS)

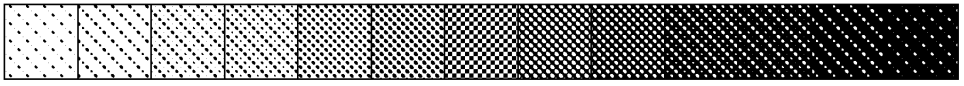
Harlequin Micro Screening uses a Respi screen structure to allow greater highlight gradation even at high screen rulings. It does this by using half the nominal screen between 0% and 5% dot area and between 95% and 100% and the nominal screen ruling between 20% and 80% dot area. Between 5% and 20%, and between 80% and 95%, HMS goes through transition zones.

Two variants of HMS are included in HSL; one where the dot shapes in the 20% to 80% tints are very similar to the standard Euclidean dot shape, and one where they closely resemble the standard Elliptical shape.

HMS Euclidean:



HMS Elliptical1:



If you have been limiting the screen frequencies that you use because you cannot be certain of holding the small highlight and shadow dots with finer

screens then HMS should allow you to output at significantly higher frequencies. However, it does not assist you if you need to limit your screen frequencies because of press registration problems.

HMS may be used to extend the length of print runs in situations where this is normally limited by drop-out increasing as the print run progresses.

HMS acts on both the screen frequency and angle as defined in the Edit Style dialog box in the RIP.

Careful calibration can improve output quality when using HMS. The Euclidean variant of HMS is symmetrical, but you should normally produce separate calibration sets for positive and negative output of the Elliptical HMS form.

5.11.6 Troubleshooting HSL

An `undefinedresult` error from `setscreen`, `setcolorscreen`, or `sethalftone` is probably due to one of the following:

- An attempt has been made to use a screen set which has not been enabled, or where the password entered for that screen set is incorrect for the current security number. This can occur if an incorrect password has been entered accidentally or if the dongle has been changed from that for which the password was originally created.

  Note: Selection of HSL screens in the Screening dialog box is enabled when any nonzero number is entered in the Enable Feature dialog box for that screen set—the ability to select a HSL screen does not necessarily imply that the number entered is correct for use with the specific dongle connected.

- An attempt has been made to use an HDS screen when HDS has been correctly enabled, but one or more of the appropriate HDS screen caches is not present.

5.12 Automatic detection of color separations

There are several procedures in process separated work where the RIP must know which color is being interpreted:

- Using HCS and HDS correctly.
- Overriding screen angles.
- Recombining preseparated jobs.
- Warning of an attempt to separate a preseparated job.

Identifying the color in auto-separated jobs is simple, but all versions of the RIP supporting HSL are also capable of detecting which color is being interpreted in preseparated PostScript from a very wide variety of applications.

While the detection methods used have a very high success rate they are not guaranteed to function with all PostScript-language files generated by applications. See Section 11.7.2 on page 444 for details about the **Recombine preseparated jobs** option.

5.13 Using Harlequin Harpoon PCI

Halftone screening is computationally intensive and can dramatically slow down the rendering of a page. One solution to this bottleneck is off-loading halftone screening calculations to specially-designed hardware. See Appendix D, “Harpoon PCI Screening Accelerator” for details.

6

Configuring the RIP

Chapter 3 through Chapter 5 describe how you can use the Harlequin RIP to configure the appearance of any page of output sent to a printer or the screen.

This chapter shows how you can also configure the way in which the RIP works, allowing you to get the best performance from the RIP working with your particular computer, network, and output devices; together with system software and any other applications running on the computer.

You have control over a variety of settings, including the following:

- The folders in which certain files are placed by the RIP.
- The page buffer mode that the RIP uses.
- The use of buffers in memory.
- Job timeouts.
- Memory allocation.

All of the options described here are available from the Configure RIP dialog box or subsidiary dialog boxes.

You can also reset the RIP to its factory settings, as described in “Resetting the Harlequin RIP to default values” on page 268, or choose a different language to be used in dialog boxes, menus, and messages, as described in “Choosing the user interface language” on page 269.

6.1 Configure RIP dialog box

The Configure RIP dialog box is displayed when you choose **Configure RIP** from the **Harlequin RIP** menu or type Command-R. (If there is an **Input Queue** menu, you must stop the input queues before you can choose **Configure RIP**: choose **Stop Input Queue** from the **Input Queue** menu.)

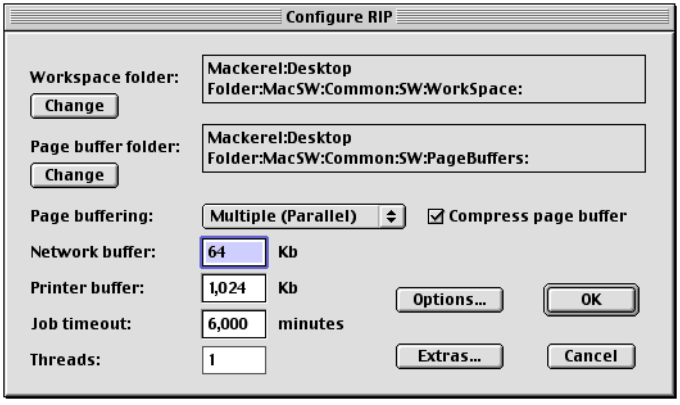


Figure 6.1 Configure RIP dialog box

Section 6.2 through Section 6.7 on page 263 describe the use of items in this dialog box.

Section 6.8 on page 265 describes the use of the dialog box displayed when you click the **Extras** button.

The **Options** button leads to another subsidiary dialog box: described in part of Section 6.3 on page 258; and in Section 6.9 on page 266 through Section 6.12 on page 268.

6.2 How the Harlequin RIP controls files

You can configure the RIP so that certain files are always kept in particular folders on your machine. You can specify the following:

- Workspace folder.
- Page buffer folder.

6.2.1 Workspace folder

This folder is used as general disk workspace. If there is not enough RAM available, the RIP will create temporary files in this folder to use as workspace. This might occur if you are processing jobs that contain very large images.

By default, the workspace folder is called `WorkSpace`, and is found in the `SW` folder. You can specify another location for the workspace by clicking the **Change** button in the Configure RIP dialog box and specifying a folder of your choice.

The amount of disk space required for workspace will vary a lot from job to job. It is worth remembering that jobs containing large images scanned at high resolution will often produce very large workspace files, amounting even to many megabytes. Simple jobs, however, may require none at all.

6.2.2 Page buffer folder

When the RIP buffers pages to disk, they are placed in the page buffer folder. By default, this is called `PageBuffers`, and is found in the `SW` folder. If you want to choose somewhere else, click the **Change** button in the Configure RIP dialog box.

Note: From Eclipse Release SP1 the `MediaSavingDir` is located as a subfolder to the `PageBuffers` folder. Do not select the `MediaSavingDir` as the location for page buffers.

Pages are normally compressed when they are buffered to disk, so it is hard to estimate how much space will be needed for the page buffer folder, because compression ratios can vary.

When the RIP is in either of the single modes, any stored page buffer is deleted once the page has been printed.

In one of the multiple modes, old pages can be kept if enough space is available. These pages can be deleted automatically as required, by selecting the appropriate **Delete** option in the Output Controller. (See Chapter 5, “Harlequin RIP Output Methods”.)

Note: The choice you make for the **Delete** option is remembered between RIP sessions, by recording it in the page buffer folder. Thus, the choice is lost if

you choose a new page buffer folder, but is found again if you return to using the original folder.

The page buffer folder should be held on a local disk, rather than on a server. In addition, if you are using an output device with a very high data rate, this disk must be fast enough to keep up with the printer.

6.3 Control of page buffering modes

The options in the Configure RIP dialog box allow you to decide whether or not pages will be buffered on disk, and if they are, whether they will be compressed automatically.

Chapter 5, "Harlequin RIP Output Methods", gives full details of what happens when you use the various page buffering modes. The following text tells you how and why to choose a particular mode.

6.3.1 How to choose the page buffering mode

You can choose which mode to run the RIP in by selecting one of the items in the **Page buffering** of the Configure RIP dialog box.

6.3.2 Using a printer that can stop / start

Some background information may help you understand this feature. Several output devices supported by the RIP require a continuous high-speed flow of data when they are imaging while others can stop and restart (*stop / start*) when there is a pause in incoming data, with little or no effect on the produced image. In many of the printers supported by the Harlequin RIP, stopping has no bad effect and may pass unreported. However, in many imagesetters, stopping can produce some visible difference in the produced image so these imagesetters report to the RIP the fact that they have stopped / started.

Normally when outputting, if the printer reports a stop / start, the page will not be output. However, when using Single, Multiple, or Multiple Parallel mode, the RIP will always make page buffers on disk, and if your system is configured with a sufficiently fast disk, the printer will never stop / start. If

the disk may not be fast enough, then you can set the **Allow stop / start** option in the Configure RIP Options dialog box to allow the page to output.

When using Single (if required) mode, if the printer runs so fast that it catches up with the data being supplied by the RIP, the RIP will create a page buffer containing the data for the current page.The RIP will then reprint that page before carrying on with the next page.

However, if your printer can stop / start, you have two options:

- Allow a page buffer to be created and output again. If the page buffer still cannot be output fast enough to keep up with the printer, the job will be aborted.
- Stop the printer until enough image has been processed, and then start the printer again.

You can choose which of these should be done from the Configure RIP Options dialog box, as shown in Figure 6.2. Display this dialog box by clicking on the **Options** button on the main Configure RIP dialog box.

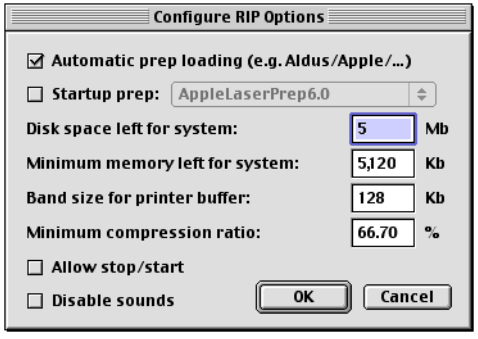


Figure 6.2 Configure RIP Options dialog box

- If you select the box labeled **Allow stop / start**, the second option will be used. If the box is not selected, a page buffer will be created and the page output again. By default, the box is not selected.

Even if your printer allows stop / starting, you may not necessarily want to use this feature. Stopping and starting some printers will cause a degradation in the image.

6.3.3 Compressing page buffers

The box labeled **Compress page buffer** in the Configure RIP dialog box controls whether or not page buffers are compressed as they are created. By default, page buffers will be compressed. The advantages of this are:

- It saves disk space—the compressed page buffers are smaller.
- It is likely to be fast—the computer running the RIP is likely to be able to produce image data faster than the disk can receive it. Writing smaller files to disk for compressed buffers will save time.
- It reduces the possibility of banding in printers that require a very high data rate. Compressed page buffers allow the RIP to send data to the printer more quickly and prevent banding in the output.

The data rate of a printer is the speed at which it accepts data for printing. Many printers require a data rate in the range 1 through 2 MB per second. On some platforms, this is only possible with compressed page buffers.

For some combinations of processor speed, disk capacity, and disk speed, you may wish to limit the use of compression. You can do this using the **Minimum compression ratio** option in the Configure RIP Options dialog box, as described in Section 6.3.5.

There are very few cases where you will *always* want to use uncompressed page buffers. If you do want this choice, clear the **Compress page buffer** box.

6.3.4 Band size for printing buffer

The **Band size for printing buffer** option in the Configure RIP Options dialog box also has an effect on the performance of driving an output device. The value specifies the size in kilobytes (KB) of the bands into which the RIP divides a page for rendering, in the slow scan direction. Larger bands mean the page is divided into fewer pieces. Changing the size will alter performance characteristics.

Large pages (either in area or bits-per-pixel) mean that many fewer scan lines can be accommodated in each band and this can slow down the system. On the other hand, too many scan lines in a band means that each band takes longer to process and could lead to stalling the output device.

For each band in the page the RIP must examine all the display list items present in the band, and render only those parts of each object that intersect the band. The larger the band, the more scanlines that can be fitted into the band leading to an increase in performance. However, in this case, memory requirements are generally higher which leads to a decrease in performance if memory is limited. It is important to note that the bandsize / performance trade-off is affected by resolution, page width, PDF transparency, in-rip trapping, anti-aliasing (for example. tiff output), and scaling, as well as the number and layout of objects within the page. In addition, band size is fixed for each RIP session even though different page setups may be more optimally served by different band sizes.

The value you should enter depends on the configuration of your machine. Typical values are 128 KB for black and white output, and more for output in color, perhaps 256 KB. Adjust these values according to experience with your configuration.

6.3.5 Minimum compression ratio

This option in the Configure RIP Options dialog box has an effect only when you have selected the check box **Compress page buffer** in the Configure RIP dialog box. It allows you to limit the use of compression to cases where there is a significant saving of disk space. For example: if the value you enter here is 60%, the RIP compresses only bands in page buffers that compress to a size smaller than 60% of their uncompressed size.

The value you should enter depends on the details of your system and the relative importance you attach to minimizing disk usage or processing time. Typically, useful values are in the range 50% through 100%. Enter a value of 100% to have all bands compressed. You may want to choose a much lower figure where there is a large amount of fast-access storage and compression is slow in comparison to disk access.

6.4 Job timeout

The job timeout allows you to control when the RIP will stop trying to process a job. This is useful for various reasons:

- It can protect against infinite loops in PostScript-language code. If there is an infinite loop in a job, it will never finish processing. Using a timeout ensures that, after a set period of time, the RIP will stop processing such jobs.
- By altering the timeouts available in the RIP, you can to some extent prevent loss of productivity by timing out complex, but correct, jobs before they consume too much machine time. (Subsequently, you can rerun such jobs under operator control and supervision: for example, with more resources temporarily devoted to the RIP.)

6.5 Threads and parallel processing

The **Threads** option in the Configure RIP dialog box is disabled in versions of the RIP that can use only a single processor.

In a symmetric multiprocessing (SMP) version of the Harlequin RIP running on a suitable hardware platform, you can use this control to set the number of parallel processes used by the RIP. In all normal use, you should set this value equal to the number of processors available in your system: this will produce the fastest rendering. Other, smaller, values may be useful in testing or troubleshooting.

6.6 Network buffer size

This buffer lets the RIP read data from the input source before actually needing to process it. Having this ability has two advantages:

- It increases throughput.
- The application that is sending the data to the RIP becomes free sooner.

6.6.1 Increasing throughput

With many jobs, there are large amounts of data to be read, often across slow networks, so it is desirable to use any available time reading in the data, rather than waiting for the RIP.

For example, when printing the Seybold *Musicians* test job (approximately 32 MB of PostScript-language code, in four separation pages of 8 MB), a network buffer of 8 MB is desirable, since this means that while one separation is being processed, the next one can already have been read in, ready for processing when the previous one is finished. Without a network buffer, when one page is finished, the RIP would have to wait for 8 MB to be read slowly from the input before it could be processed.

6.6.2 Freeing the sending application

The network buffer also increases productivity in the workplace, by freeing the applications sending jobs sooner. You will be able to work with the application again as soon as the job has been read into the network buffer, even though the RIP may only have processed a small portion of it.

For example, when printing the Seybold *Musicians* test job, your sending application can be freed in about three minutes if a 32 MB network buffer is used, even though the job might take 10 minutes to output overall. On smaller jobs, such as the Seybold *Trout* test (approximately 200 KB of PostScript-language code), it is possible to free your application in about 30 seconds, even though the job will take up to five minutes to output overall.

To change the size of the network buffer, enter the number of KB you require in the text box labeled **Network buffer** in the Configure RIP dialog box. It is 64 KB by default. If there is not enough memory for the requested network buffer, its size will be reduced automatically.

6.7 Printer buffer size

The printer buffer is used to store processed raster data that is ready to be sent to the printer.

When outputting, data is always placed in the printer buffer before being copied out to the printer as required. In most cases, if the printer is not continuously fed data, one of the following may happen:

- Banding (gaps) may appear in the output.
- Pages may be aborted (for example, in a laser printer).
- The printer may stop / start.

This is known as *data underrun*.

To avoid data underrun, the RIP must ensure that the printer buffer never becomes empty. However at any given time, you cannot guarantee that the RIP is sending data to the buffer—it may be processing the next page of data if you are running in Multiple (Parallel) mode, or there may be other applications running that the RIP has to wait for. If the printer buffer empties and you get data underrun, try making the printer buffer larger.

For example, assume you are sending output to a fast 900 KB/second printer, while using another application at the same time, and that application does a screen update that takes 3 seconds (during which time the RIP is locked out). In that time, the printer could consume $3 \times 900 = 2700$ KB (2.7 MB) of data. To prevent data underrun, you must ensure that you have a printer buffer at least this big.

In practice, a printer buffer in the range 4 MB through 12 MB is usually adequate. This total includes any buffering memory on interface cards or in the output device, but if there is such memory it needs separate installation or configuration. From the memory that the RIP controls, it allocates a minimum of 1024 KB buffer space by default.

To find the best setting for your system, try starting with a 4 MB (4096 KB) buffer, and if you have problems with data underrun, increase the buffer size until the problem goes away. If this fails, you may need a faster disk or more memory. The ability to roam large or multiple page buffers is related to the printer buffer size; 4 MB is a good starting point for this use.

To change the size of the printer buffer, enter the number of kilobytes (KB) you require in the text box labeled **Printer buffer** in the Configure RIP dialog box. If there is not enough memory for the requested printer buffer, its size will be reduced automatically.

The figure you enter is the *minimum* amount of memory that the RIP will use for buffering output. Sometimes, especially in Single (if required) mode, the RIP will use a much larger amount of memory.

Note: The amount of printer buffer memory needed varies according to job and device resolution, output device speed, computer speed, disk speed, and so on. Experiment with a larger buffer if necessary.

6.8 Extras

The Configure RIP Extras dialog box, available from the Configure RIP dialog box, is used to switch on screening strategies and layered options by entering passwords.

Note: There are other places where you may need to enter a password. Some plugins require you to enter a password elsewhere; read the documentation for the plugin carefully to find out where. Also, some language options for the user interface can require you to enable the language before you can use it—see Section 6.14 on page 269 for details.

See "Harlequin Screening Library" on page 245 for details of how to use the screening options and how to obtain and enter passwords for all options requiring passwords to be entered in the Configure RIP Extras dialog box.

The other entries in the list can include:

- `ColorPro`, to enable the color management options within the Harlequin RIP. Harlequin ColorPro is described in the separate *Harlequin ColorPro User's Guide*.
- `TrapPro` and `TrapProLite` to enable the TrapPro trapping options within the RIP. See the separate *TrapPro User Manual* for full details.
- `HDLT`, to enable Harlequin display list technology.

  Note to OEMS: Enabling HDLT has no immediate effect on the RIP menus and dialog boxes, but provides access to extra functionality for software written by OEMs.

- `PostScript` and `PDF`, to enable PostScript-language and PDF input.

- `TIFF/IT`, to enable TIFF/IT-P1 input.

  Note: There is an optional TIFF/IT-P1 *output* plugin. If this plugin is present, it shows the entry: `TIFF/IT-P1, TIFF/IT-P1`. Be careful to select the correct entry for input or output before entering a password.

- `Media Saving` to enable the Media saving facilities.

There may also be entries for plugins that require a password. These entries can be the result of:

- Security dongles that require a password before allowing use of plugins.
- Plugins that require a password for each device type that they provide.
- Multiple device plugins that require a password but group several device types so that they can be enabled with a single password.

You should receive appropriate instructions and passwords when receiving these plugins and security dongles.

6.9 Specifying prep files

Prep files are libraries of PostScript-language routines that can be down-loaded into a RIP and used whenever necessary. Many LaserWriter drivers require certain libraries to be loaded before they can be used.

You can select the following options in the Configure RIP Options dialog box.

6.9.1 Automatic prep loading

This is a built-in mechanism that, if the option is selected, automatically loads the correct prep file whenever it is needed. This can save a lot of time for applications printing over networks, especially when these applications require different prep files. For example, different prep files are used by different LaserWriter drivers on different machines by different applications.

Automatic prep loading is selected by default.

6.9.2 Startup prep

If this box is selected, the prep file selected in the pop-up menu is pre-loaded when you start up the RIP. Select the prep file that is used most often by the jobs sent to the RIP.

You do not have to use this option if automatic prep loading is already switched on, but it can be a useful option if a number of people on the network are using the same LaserWriter driver. If the correct startup prep is already loaded, it can save a few (2–5) seconds on each job.

You can use automatic prep loading at the same time as a startup prep.

6.10 Harlequin RIP memory allocation

The options in the Configure RIP Options dialog box, shown in Figure 6.2, page 259, allow you to specify the memory allocation for the RIP.

The RIP is allocated the amount of memory set in the Info dialog box from the Finder, less the amount specified in the **Minimum memory left for system** field. At present the default values are 24 MB minimum and 27 MB preferred.

Note: When using media saving features and outputting large high resolution flats, you should allocate substantially more than the default memory to the RIP. For information on media saving see Media saving option on page 162.

By default, 5120 KB of system space will be reserved after the RIP has started up.

From the total memory allocated to it at startup, the RIP allocates the printer and network buffers. All memory not used for these buffers is used by the RIP for processing jobs.

The final allocations used are reported in the RIP Monitorwindow when the RIP starts up.

If there is insufficient memory to allocate the buffers requested, the RIP tries the following methods of automatic recovery, in the order shown:

- Reducing the network buffer to a minimum of 64 KB.
- Reducing the printer buffer to a minimum of 512 KB.

If there is still not enough memory to give the RIP at least 4096 KB, the RIP will display a warning and quit.

6.11 Minimum free disk space

The Harlequin RIP allows you to ensure that it leaves free a minimum amount of disk space, which is good practice and allows for use by other applications. Specifying this reserved disk space is important for use with the two RIP modes—Multiple and Multiple (Parallel)—that can produce multiple buffers, where it ensures that the disk is not completely filled up with an unlimited number of page buffers.

The default value of the **Disk space left for system** option is 5 MB. You may want to increase it to reserve disk space for other applications running on the same machine, such as spooling programs. A reasonable value should be near the size of the largest files regularly created or copied on the relevant disk. Try using 50 MB, if this size is difficult to predict.

6.12 Disable sounds

Select this box in the Configure RIP Options dialog box to suppress the system beep normally generated when the RIP encounters an error.

6.13 Resetting the Harlequin RIP to default values

If you decide that you want to revert to the default values that the RIP is supplied with, double-click the **Harlequin RIP** icon while holding down the Option key.

A dialog box appears, asking if you wish to return to the factory defaults.

- Click **Yes** if you wish to reset any part of the current configuration.
- Click **No** if you wish to keep all of the current configuration. (the RIP starts up normally.)

If you click **Yes**, the RIP displays several dialog boxes that allow you to reset specific parts of the configuration, one after the other. For each dialog box, click the **Yes** button to reset all the configuration information described in that dialog box. Click **No** to keep that part of your configuration.

The RIP allows you to reset most parts of the configuration in this manner, including page setups, RIP configuration, media management information, and window positions.

After the last dialog box, the RIP starts up normally.

6.14 Choosing the user interface language

You are asked to make a choice of the language to be used in dialog boxes, menus, and messages when you start up the RIP for the first time. Later, you can check the exact language in use or change the language, for most combinations of languages.

6.14.1 Requirements and limitations

There is no problem in changing language if both languages are chosen from English and most Western European languages—technically described, those languages that use encodings of the ISO-Latin character set. There is also little risk in switching from ISO-Latin to a language that uses a two-byte character encodings: for example, Japanese, Traditional Chinese, and Simplified Chinese. There is a higher risk of problems if you attempt to switch *between* two languages that use different two-byte character encodings.

The operating system of your computer must support the language you wish to use. You are also likely to require the RIP localization files and a password from your supplier before you can change the language used by the RIP. If you have to install any files, restart the operating system and the RIP before proceeding.

6.14.2 Procedure

To check which languages are available or to switch to another available language, choose the **Harlequin RIP > Language** menu option. The Select User Interface Language dialog box appears, as shown in Figure 6.3.

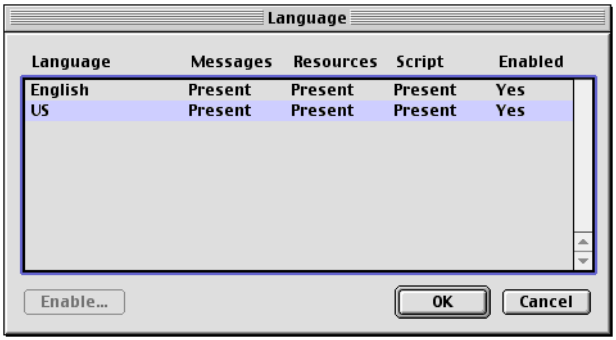


Figure 6.3 Select User Interface Language dialog box

The dialog box shows you which languages are available in a multi-column list. A language is available for immediate use if the entries after its name or code (in the **Language** column) are all `Present` or `Yes`.

The columns have these meanings

- The **Messages** and **Resources** columns show if parts of the RIP localization are present.
- The **Script** column shows if the operating system supports the language.
- The **Enabled** column shows if the RIP localization is enabled, when the entry is `Yes`; or disabled, when the entry is `No`.

Click **Cancel** if you do not wish to make a change.

You can supply a password to enable a language if the only thing making that language unavailable is a `No` entry in the **Enabled** column. Select the row for your chosen language and click **Enable**. In the password entry dialog box, enter your password and click **OK**. You should now see that the language is enabled. Check the password if the language is not enabled. (If you still have problems, click **Cancel** to continue using your previous user interface language while you obtain support from your supplier.)

To use an enabled language, select your chosen language and click **OK**. The RIP displays a dialog box asking if you wish to confirm your choice and quit the RIP. Click **Yes** if you are sure, and then click **OK** to dismiss the second confirmation dialog box.

When you restart the RIP, you should see that it is using your chosen user interface language.

Note: You may still see a small number of options in lists or messages appearing in English or another language. This is normal. For example, the **Feature** and **Calibration** lists in the Edit Page setup dialog box display the names of files, which remain unchanged as the user interface language changes. Similarly, the RIP Monitor window displays messages if they are produced directly by PostScript-language jobs and, if needed, some very rare and technical error messages.

7

Configuring Input

This chapter describes the different ways in which the Harlequin RIP can accept its input, and how to configure the RIP to use each type of input. Chapter 4, "Configuring Output Formats", describes the different ways in which you can control output from the RIP, using page setups.

There are several ways of providing input to the Harlequin RIP:

- Using one or more managed inputs, as described in Section 7.1, "Input management", and the following sections. This is the preferred method for routine use because, in general, the managed inputs allow users on many machines to submit jobs to the RIP.
- Using the **Print File** menu command, as described in Section 7.9 on page 298. This command allows a user on the machine running the RIP to print all of the job types possible on that installation of the RIP. You can use **Print File** while managed inputs are active.
- Entering PostScript-language code interactively by typing at a prompt on the machine, as described in Section 7.17 on page 331. You must disable other inputs for the duration of your interactive sessions in order to do this.

When you use managed inputs or the **Print File** menu command, you can print several types of job. The available types depend on the details of your installa-

tion of the RIP. Some types have associated settings in page setups, may require enabling with passwords, or require other care in use. The possible types, with references to full descriptions of their use, are:

- PostScript-language files (PS) and Encapsulated PostScript files (EPS), both described in Section 7.10 on page 300.
- Portable Document Format (PDF) files, described in Section 7.11 on page 301.
- JPEG and JFIF files, described in Section 7.12 on page 320.
- TIFF/IT-P1 files, described in Section 7.14 on page 321.
- TIFF 6.0 files, described in Section 7.15 on page 326.
- Harlequin RIP page buffer files, described in Section 7.16 on page 328.

7.1 Input management

In the same way that the RIP uses output plugins to provide output sources, it uses input plugins to provide input sources.

Global Graphics and OEM programmers can create input plugins, each of which may be used as one of the following:

- Input to the RIP, for example, as a source of jobs. (When installed, these plugins are obvious parts of the RIP: the description of these plugins and their configuration forms the bulk of this chapter.)
- A PostScript device on which you can open a file and read or write from a PostScript-language job. (This is not seen by the end user.)
- A filter to manipulate data. (This is not seen by the end user.)
- A source of asynchronous actions. (Most of these actions are small, specialized tasks and not directly related to output of a user job. For example, one such action enables the RIP to provide a list of installed fonts while busy with a job for output.)

There are a number of input plugins supplied with the RIP, each providing users with the ability to submit jobs. Section 7.2 on page 275 describes the way

in which you can manage these plugins and the inputs they provide. The supplied inputs are:

- AppleTalk. This lets the RIP accept input from any AppleTalk network connected to the machine running the RIP.

  See Section 7.3 on page 281 for more details.

- Spool Folder. This lets you specify multiple independent folders into which users or applications can place jobs to be printed. The RIP checks for the presence of files in these folders and prints each one automatically.

  See Section 7.4 on page 282 for more details.

- Socket plugin. This allows input to arrive over a network, which can contain different types of computer, using a TCP/IP socket.

  See Section 7.4 on page 282 for more details.

- Asynchronous socket plugin

  This is similar to the socket plugin but is only suitable for a limited number of jobs. Typically, these are small jobs performing control or monitoring functions, rather than imaging.

  See Section 7.4 on page 282 for more details.

- Asynchronous socket quit plugin

  This is similar to the asynchronous socket plugin but has the single purpose of causing the RIP to quit. It does not receive any jobs.

  See Section 7.9 on page 298 for more details.

Each of these plugins can be thought of as analogous to a multiple device output plugin, except that they provide inputs, rather than outputs.

7.2 Managing input plugins

You control input plugins using the Input Controller. Before creating new inputs or changing existing ones, check that you have an appropriate page setup to associate with each input. (While creating page setups, you can keep the Input Controller displayed, but not the subsidiary dialog boxes.)

Display the Input Controller dialog box by choosing the **Harlequin RIP > Input Controller** menu option, or clicking the tool bar button. Figure 7.1 shows the Input Controller dialog box.

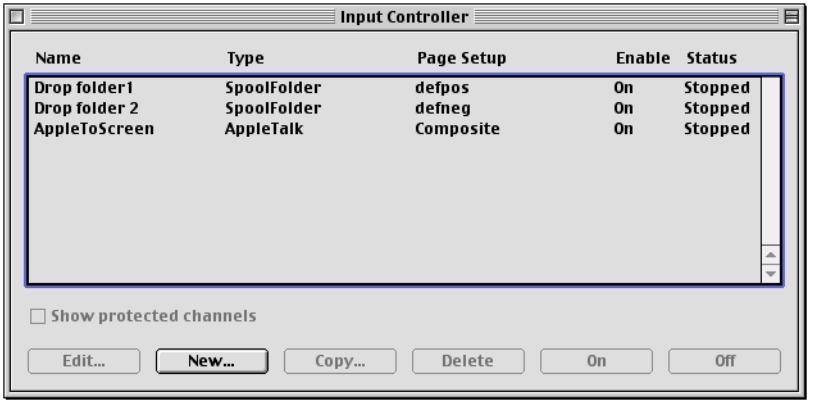


Figure 7.1 Input Controller window

The Input Controller is similar to the Device Manager, described in Section 4.11, “Multiple device output plugins”. The main list shows the input sources currently available. Each input source can be turned on or off individually using the buttons—the state is displayed in the **Status** column.

Each row in the list represents one particular source, and contains:

- The **Name** for the input source. This is used to identify the source within the RIP. It may also be used by the input plugin itself.
- The **Type** of input. This determines which input plugin the RIP uses.
- The **Page Setup**. This is the page setup used by all jobs arriving through this source.
- The **Enabled** state. This should be `On` to make the source available when you start the RIP or start inputs.
- The **Status**. This can be `Stopped`, `Idle`, or `Busy`.

An input is stopped either because all inputs are stopped, because you have disabled this input in the Input Controller (using **Off**), or because of a problem when trying to start that input. An idle input is ready to receive a job but none is arriving. A busy input is actually receiving a job.

You can also choose to see the same information about items that are not controllable from the Input Controller. The check box below the list gives you this ability:

Show protected channels

Select this box if you wish to see, but not control, the status of *protected channels*. This box is grayed out if there are no protected channels.

Protected channels are channels that have been created outside the Input Controller—possibly by executing PostScript-language commands in configuration files that the RIP used when starting up—and marked as being outside routine user control. Typically, a protected channel is not an input source for imaging jobs: instead, it performs one of the other functions described in "Input management" on page 274.

Below the list of sources are several buttons that allow you to perform the various actions described in sections 7.2.2 through 7.2.7.

When you have finished making changes in the Input Controller, you can keep it visible as a way of monitoring which inputs are submitting jobs or close it using the **Harlequin RIP > Input Controller** menu option or the tool bar button.

7.2.1 Turning on the input system

To start receiving jobs from the configured and enabled inputs, choose **Start Inputs** from the **Harlequin RIP** menu, or type Command-I. When you do this, there is a delay of a few seconds as the various defined input sources are initialized, and then the RIP starts to accept jobs from those sources.

The status area of the tool bar shows the searching for input symbol (a torch or flashlight shining on an arrow).

A new menu appears in the menu bar, called **Input Queue**. This menu has these options:

- **Kill Current Job**. This causes the job currently processing to be aborted. It may take a few seconds.
- **Stop Input Queue**. This turns off the input system when the job currently processing has finished.
- **Abort Input Queue**. This aborts the job currently processing and then turns off the input system.

7.2.2 Adding a new input source to the list

You can create many different input sources for each input plugin. For example, you could create 5 spool folder input sources and 10 AppleTalk input sources.

To add a new input source to the list:

1. Click the **New** button in the Input Controller. The RIP displays an Input Channel Edit dialog box, similar to that shown in Figure 7.2, allowing you to fill in the details for this source.

Figure 7.2 Input Channel Edit dialog box

2. Type a name for the plugin device in the **Name** text box.

   The name is used to identify the source within the RIP. It may also be used by the input plugin itself. If you create an AppleTalk input device, when you start inputs a printer of this name becomes available on the AppleTalk network.

3. Choose the plugin type from the **Type** pop-up menu.
4. Choose a saved page setup from the **Page Setup** pop-up menu: the RIP applies this page setup to each job arriving at the source.
5. If the plugin is to be initially turned on, select the **Enabled** check box.
6. Click the **Configure** button to display an input plugin Configuration dialog box, allowing you to specify details relevant to the plugin you have chosen.

   The Configuration dialog box varies according to the type of plugin chosen. It is used to give details about how the input is to be handled, and to set up any hardware associated with the source. See Section 7.1 on page 274 for a list of input types and page references to their configuration and use.
7. When you have specified all the details for the new source, click **OK**.

7.2.3 Copying an input plugin

When you have created an input plugin, you can copy it to create other inputs of a similar type. This can save you some effort, depending on the complexity of the Configuration dialog box.

To copy an existing input, select the entry in the Input Controller and click the **Copy** button.

You must give the copied input a new name and you will probably need to alter some details in the Configuration dialog box. For example, only one active input can use a particular spool folder or network input at one time—but you can have two or more inputs using the same source, provided that you enable only one at a time.

7.2.4 Editing the details for an input source

To edit the details for an existing input source, do one of the following:

- Select the entry in the Input Controller and click the **Edit** button.
- Double-click the entry in the Input Controller.

The RIP displays an Input Channel Edit dialog box, allowing you to edit the details for the selected plugin. For full details of using this dialog box, see Section 7.2.2 on page 278.

7.2.5 Configuring an input plugin

Configuring an input means giving details about how the input is to be handled, and setting up any hardware or software associated with the source.

To configure an existing input plugin, select it in the Input Controller and click **Edit**. The RIP displays the Input Channel Edit dialog box. Click **Configure** to see the Configuration dialog box for the selected input. See Section 7.1 on page 274 for a list of input types and page references to their configuration and use.

7.2.6 Deleting an input source

To delete an input source from the RIP, select it in the Input Controller and click the **Delete** button. (You can select multiple inputs and delete them in one action.)

7.2.7 Enabling and disabling input sources

To enable an input source, select it in the Input Controller and click the **On** button. To disable a source, select it and click the **Off** button. Using these buttons has the same effect as selecting or clearing the **Enabled** check box in the relevant Input Channel Edit dialog box.

When the selected input source is enabled then the **On** button is disabled, and when it is not enabled then the **Off** button is disabled.

You can select several input sources and then turn them on or off together.

When an input plugin is enabled, the RIP automatically publishes it when starting input queues, meaning that the input plugin can be used to send jobs to the RIP.

To make enabled inputs active, choose **Harlequin RIP** > **Start Inputs** or click the tool bar button that has a picture of a green arrow and traffic light. (See Section 7.2.1, “Turning on the input system”.)

To stop all enabled inputs, choose **Harlequin RIP** > **Start Inputs** again or click the tool bar button that has a picture of a red arrow and traffic light.

7.3 Using the AppleTalk input plugin

An AppleTalk input source publishes a name over the network. This name appears in the Chooser on Macintosh computers connected to the network, making the RIP available just like a LaserWriter. Other, non-Macintosh, computers connected to the network and able to use AppleTalk can also use the RIP as an AppleTalk printer. In complex networks, there may be a need for extra actions before all computers can use a new printer.

7.3.1 Configuring an AppleTalk input source

To configure an existing AppleTalk input source, select the source in the Input Controller and click **Edit**. The RIP displays the Input Channel Edit dialog box. Click the **Configure** button. The AppleTalk configuration dialog box appears, as shown in Figure 7.3.

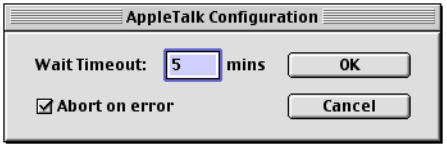


Figure 7.3 AppleTalk Configuration dialog box

Wait timeout This value sets the length of time, in minutes, that the input source waits for data. If no data is sent for that length of time and the RIP is waiting for data, the job is aborted.

Abort on error This control sets the behavior of the input plugin on detecting an error. By default, this box is selected, which means that an error causes an immediate abort. This is not the typical behavior of a PostScript-language compatible interpreter but it may save considerable time spent in transferring data which is merely flushed (ignored) by the interpreter.

Clear this box if you encounter problems with network software or wish to ensure full compatibility with other PostScript-language compatible interpreters.

7.4 Using the Spool Folder input folder

A spool folder input source regularly scans a specified disk folder (directory), and processes any PostScript-language files (and other suitable files) that are placed there. Normally these files are deleted after successful processing. The spool folder can be on a network file server, or the local machine. Users create files from their applications. These applications can create the files directly in the spool folder, or can create them elsewhere (for example, on the local system) for later transfer into the spool folder.

The RIP can process some or all of the following file types using a spool folder: PostScript-language (PS), Encapsulated PostScript (EPS), Portable Document Format (PDF), TIFF 6.0, *single* TIFF/IT-P1 subfiles or TIFF/IT-P1 file groups if supplied in order, JPEG and JFIF files. With some preparation you can also process page buffers from a similar version of the Harlequin RIP. The available options depend on your installation and configuration of the RIP.

Note: You cannot use a spool folder for printing FP TIFF/IT-P1 files without special care, because FP files reference subfiles and the RIP must image the data in these files in a set order. If, in a spool folder any of the CT, HC, LW, or FP files may arrive first, then the result may be partial images. The spool folder *can* accept TIFF/IT-P1 files *if* the order of arrival and file naming can be controlled so that all subfiles arrive before the FP file *and* you select the TIFF/IT-P1 option described on page 288. If the order of arrival or naming is unsuitable or unpredictable, using **Print File** from the **Harlequin RIP** menu is the simplest reliable method of ensuring that the RIP images the intended file or combination of files.

The RIP ignores types of files that it cannot print, and any files that you exclude intentionally by configuring the spool folder input.

You can exclude files based on their names. You may want to exclude files that resemble real jobs, but that actually contain accounting or housekeeping information for the software that delivers files into the spool folder. You may also

want to exclude, or at least delay, real jobs with particular origins or qualities. All this is possible so long as the file names have a recognizable prefix.

You specify which folder the RIP uses in the input plugin Configure dialog box, available from the Input Controller. By default, this folder is called `Spool` and exists in the `SW` folder. If needed, you can create several spooled inputs, each with its own folder, page setup, and exclusion list.

When you specify a folder accessed over a network, make sure that the folder automatically becomes available to the computer running the RIP when that computer is restarted.

Because files are normally deleted as soon as they are printed, it is important to ensure that the RIP has permission to delete files in the spool folder, particularly if the spool folder is on a network file server. See Appendix A, *Troubleshooting*, for more details.

The files in the spool folders are processed in the order in which they arrive. However, if there are jobs already in a folder when the RIP is started, or if a very large number of files have been queued, the RIP determines the order of those jobs by the date stamps on the files.

7.4.1 Configuring a Spool Folder input source

To create and configure a new Spool folder source:

1. Click **New** in the Input Controller. The RIP displays the Input Channel Edit dialog box.
2. Choose `SpoolFolder` from the **Type** drop-down list. Give the input a suitable name and select a page setup. Select the **Enabled** box.
3. Click the **Configure** button. The Spool Folder Configuration dialog box appears.

Make the settings you wish, and click **OK**. Click **OK** again to close the Input Channel Edit dialog box. The spool folder input becomes active, now or when you next start inputs. When the spool folder becomes active, the RIP reports

the number of exclusions, that is the number of prefixes that it will ignore. See the description of the **Filenames prefix list** option on page 286 for details.

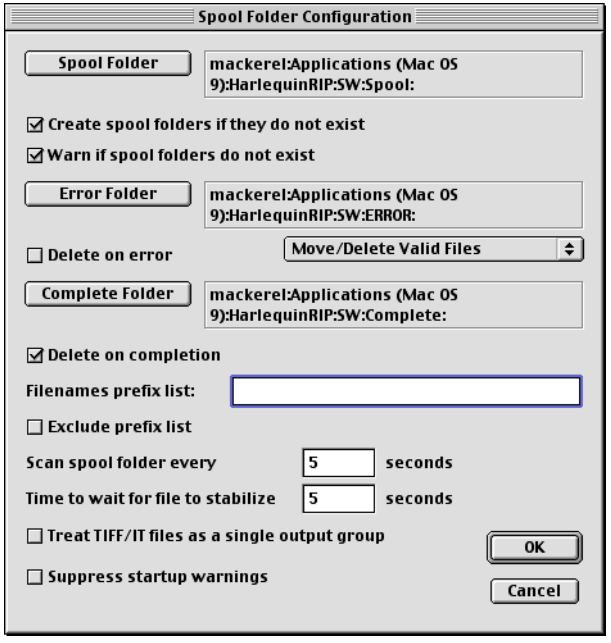


Figure 7.4 Spool Folder Configuration dialog box

This dialog box contains the following control items:

Spool Folder The current spool folder is shown in the text field alongside this button. This location is where the RIP detects the arrival of files and considers them as possible jobs, by looking at the type of file and any file names excluded in the **Filenames prefix list**.

Note: Choose a folder that is dedicated to receiving jobs. In particular, avoid using folders where other files are arriving or changing. (For example, the `SW` folder is a bad choice, because the log file changes with every job.)

Click the **Spool Folder** button to change this folder using the standard file browsing dialog box. Alternatively, you can type a full path name in the text field but be aware that any typing errors can cause an error or the creation of a new folder.

Create spool folders if they do not exist

Select this box if you want the RIP to create the named spool folders if they do not already exist.

The RIP creates the folders when the input channel becomes available for use. This time can be immediately after you click **OK** in the Input Channel Edit dialog box for an enabled channel, but you may need to choose **Harlequin RIP > Start Inputs** or enable the input channel before it becomes fully available.

Warn if spool folders do not exist

Select this box if you want the RIP to issue a warning if a folder named as a spool, error, or completion folder does not exist.

Error Folder If a file fails to print, the RIP moves it to the error folder specified unless the **Delete on error** box is selected. If a file prints successfully, the RIP moves it to the Complete folder specified unless the **Delete on completion** box is selected.

Delete on error Select this box if you want the RIP to delete files that the Spool folder fails to print. Leave this box clear if you want failed files to be moved to the Error Folder. Note that a file is treated as an error if you abort it while it is being processed.

`Move/Delete All Files`

With this option selected the spool plugin will either move to the error folder, or delete any file which it does

not recognize (such as badly formed PDF documents). The files are moved or deleted depending on the state of the **Delete on Error** check box.

Warning: If you decide to use this option and you inadvertently choose to point the spool folder at a directory containing important files (such as **`C:\windows...`** or your **`SW`** folder), you will remove all files therein, resulting in either a non-functional computer or non-functional applications. The plugin deletes or moves all the files it cannot handle.

`Move/Delete Valid Files`
This option replicates the previous (pre Eclipse Release SP2), behavior of the spool folder plugin. In this case, if a file is encountered which the spool plugin does not recognize it will leave the file in the spool folder and ignore it. Valid files which cause an error will be treated according to the setting of the **Delete on Error** check box.

Complete Folder If a file successfully prints, the RIP moves it to the location specified in the text field alongside this button unless the **Delete on completion** box is checked. Click the **Complete Folder** button to change this location using the standard file browsing dialog box.

Delete on completion
Select this box if you want the RIP to delete files that the Spool folder succeeds in printing. Otherwise the RIP moves these files to the Complete Folder.

Filenames prefix list
This text field specifies files to ignore when they arrive in the spool folder, if you have also selected the **Exclude prefix list** box. The specification is based on the first part or *prefix* of the file names.

Prefixes are case sensitive.

For example, if you type in the prefix `ab`, the RIP ignores all the arriving files whose names begin with `ab`. Examples of files that the Harlequin RIP would ignore for this prefix are `abacus.pdf`, `abandon.ps`, and `ab123`. (The RIP would *not* ignore `ABALONE.PS`, `123ab.pdf`, or `_absence`.) *Ignoring* means that the RIP does not process the files and allows the files to remain in the spool folder until removed by a user or other software.

Note: If you remove or disable a prefix while the spool folder is still active, the RIP processes any files previously excluded by that prefix but still present in the spool folder.

You can enter several prefixes. Separate multiple prefixes by commas without surrounding spaces. (If you add spaces after a comma, the RIP treats the spaces as part of the following string.) Each prefix can include alphanumeric characters, the underscore character, the period character, and spaces.

For example, this is a valid list of three prefixes: `aaab_c,BAC,4.4`

Exclude prefix list

Select this box to make the prefix list active. Leave this box empty to disable the prefix list without deleting the list of prefixes.

Scan spool folder every <*n*> seconds

The value in the text box specifies how often the RIP checks the Spool folder for new files to be printed.

Time to wait for file to stabilize

The value in the text box specifies the number of seconds that the Spool folder waits for the size of an arriving file to remain the same before assuming that it has been fully written and is therefore ready to be printed.

Treat TIFF/IT files as a single output group

Select this box if you want to process TIFF / IT-P1 files as a group, but only if you can predict that both the file names and the order of arrival follow these conditions.

All related files must have the same file name stem. For example, this is a valid group of files: `myfile.ct`, `myfile.lw`, `myfile.hw`, and `myfile.fp`.

All subfiles must be in the spool folder before the FP file arrives and is ready to print.

After processing a TIFF / IT-P1 group, the RIP moves or deletes all the related files together, with the action depending on success or failure and the settings of other controls in this dialog box.

If you leave this box unselected, the RIP processes the individual files as they become available.

Note: When producing TIFF / IT-P1 files as *output* using the optional TIFF / IT-P1 output plugin, the RIP satisfies the rules for having the related files treated as a group.

Suppress startup warnings

If you have files present in the Spool Folder and then start the RIP, you will be prompted with a warning that files already exist in this folder which you must acknowlege before the RIP will start. If you would prefer to suppress these startup warning messages and continue to start the RIP, select this option. All files present in the folder will be processed.

7.5 Using the Socket input plugin

A socket is a hardware-independent method of communicating across a network. The RIP Socket plugin supports TCP / IP on Ethernet for job transfer between any combination of machines running the UNIX, Windows NT, Windows 2000 and Windows 2003 operating systems. From socket version 2.1r1 the plugin is supported on Mac OS X.

The RIP Socket plugin also supports a smaller set of features on Power Macintosh computers (but not 680x0 based Macintosh computers). This smaller set of features is supported between any combination of Power Macintosh computers and machines running the UNIX or appropriate Microsoft Windows operating systems.

The benefits of using network sockets are:

- Transfer of jobs between different types of machines occurs at network speeds—typically much higher than those achieved with serial links.
- One server machine (the one running the Harlequin RIP) can receive input from as many sending machines as can connect to the network. (The RIP must finish one job before starting another, including jobs from other types of input plugin.)
- All sending machines are configured in the same way.
- Given an existing network, there is no requirement for extra hardware or shared file systems.
- A program or user on the sending machine can be informed of the job status as the job progresses.

There are some potential, minor, difficulties with socket input:

- It requires a small amount of central network management, or user access to configuration files, on the sending and receiving machines. This management or user access is required only when setting up the links, not for routine use.
- In general, the socket input plugin accepts only PostScript-language and PDF input, sent with a basic TCP/IP stream protocol. This protocol is simple to generate but prohibits the direct use of any extra protocol such as that used by the UNIX `lp` program. (The Xinet PapConnect protocol is an option if there is no Macintosh computer involved.)

Note: Prior to the release of the Socket plugin v2.1r3, jobs received on an input Socket were named by the input channel, and not the job. A page feature was provided to overcome this. From the release of the Socket plugin v2.1r3 the page feature is added to the plugin and thus will use the name within the job.

Note: Most machines running sockets can support several independent types of communication and there is usually ongoing communication for processes including mail, printing, and file transfer. The different types of communications are kept separate by assigning each to a different port, usually identified by number. Port numbers below 1024 are listed in a services database and have registered uses and protocols that enable computers at local and remote sites to communicate according to published standards. Some numbers above 1024 also have agreed uses, but most are available for use in a way specific to a single site, as allocated by the local network manager or system administrator.

Prior to release of the Socket plugin v2.1r3, jobs received on a Socket input were named by the input channel, and not the job. A page feature was provided to overcome this. From the release of the Socket plugin v2.1r3 (shipped with Harlequin RIP, Eclipse Release), the page feature is incorporated within the Socket plugin and thus will use the name within the job.

7.5.1 Requirements

All machines need to support TCP/IP over Ethernet and to be linked by a network. This is the only requirement for machines running the UNIX, Mac OS X, Windows NT, Windows 2000 or Windows 2003 operating systems.

Classic Macintosh computers need the following:

- Open Transport, an operating system extension that comes as standard on Power Macintosh computers with software support for PCI expansion buses. Open Transport is compatible with operating system versions from System 7.1 onwards.
- The computer must be a Power Macintosh, that is, it must not be based on the 680x0 processor family.

7.5.2 Configuration preliminaries

Before attempting to configure a socket you must decide what kind of connection you wish to make and how to implement it. This subsection describes your options and what you need to know before configuring the RIP socket input.

In the simplest case, applications on one or more machines send information to the machine running the RIP and receive no messages about the progress of the jobs.

It is a simple extension to make the standard output from the PostScript-language interpreter—progress and other messages as displayed in the RIP Monitor Harlequin RIP window—available to the application sending the job.

7.5.2.1 Server machine

To configure the machine running the RIP, you must know:

- The port on which the socket plugin is to listen for input.

Optionally, you may need to know:

- A second port, if you wish to return the standard output to the sending application and that application requires a separate port.
- Any protocol in use by the sending application. The options supported by the Harlequin RIP are basic TCP/IP socket stream or Xinet PapConnect.

In general, you can ask your network administrator to allocate a port (or ports) and give you the number(s) or name(s) to enter in the RIP. Using a name rather than a number allows the flexibility of changing only the services database if it becomes necessary to start using another port.

If you have no network administrator, you may need to look at the services database yourself in order to find ports that are available for use. In the UNIX operating system, the services database is the file:

`/etc/services`

Under Windows NT and Windows 2000, the position of the services database can vary between different installations of the operating system. The administrator can choose where to install the operating system (with the chosen location recorded in the environment variable `%Systemroot%`) and the services database is stored in a fixed relationship to this location. For example, if the operating system is installed in `\winnt` then the services database is the file:

`\`*`winnt`*`\system32\drivers\etc\services`

On Macintosh computers, there is no services database. (This means that you must choose ports using **TCP by number** on a Macintosh, but you may be able to inspect the services database on a computer of another type if you are operating on a mixed network.)

Warning: Where used, the services database is an important part of a networked operating system. Make a copy of the services database file before editing it in any way.

7.5.2.2 Sending machines

To configure the machines sending jobs to the RIP, you must know:

- The network address (IP address or hostname) of the machine running the Harlequin RIP.
- The port on which the machine running the RIP is listening for input.

Optionally, you may need to know:

- A second port, used to return the standard output to the sending application. (The RIP can return this information on the server port: a second port is only needed if the sending application requires a separate port.)

Your network manager should be able to supply these details.

All other settings are dependent on the software used to send the jobs, and must be compatible with those you have made in the Socket Configuration dialog box. For example, you may need to configure the sending software to receive the PostScript-language status messages.

We recommend that you configure each sending application to close its sending socket connection at the end of each job, and pause before reopening it to send another job. The reasons are:

- You can configure the RIP to receive input on more than one socket input—for example, to allow the use of different page setups. (Each socket must use a different address.) Closing the connection allows the RIP to check for pending jobs on other input channels.
- Certain jobs may require that the server socket is closed before the RIP can start rendering. If the socket is not closed, rendering starts when the next job starts to arrive, which could result in a significant delay.

7.5.3 Configuring a Socket input plugin

To configure a new socket input, click **New** in the Input Controller. The RIP displays the Input Channel Edit dialog box. Choose a name and page setup as normal, then choose `SocketInput` from the **Type** pop-up menu drop-down list. Click the **Configure** button. The Socket Configuration dialog box appears, as shown in Figure 7.5.

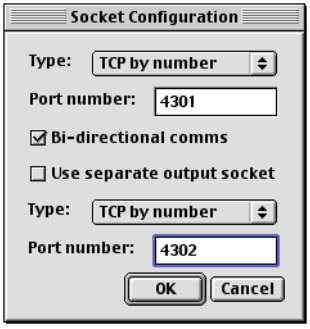


Figure 7.5 Socket Configuration dialog box

Note: The upper **Type** and **Port number** controls are for the server socket. The server socket always receives input, and may be used for output. The lower controls are for the optional separate output socket.

You must make settings for the server (input) socket. The other (output and protocol) settings are optional but interrelated: you may need to make more than one choice to have a valid combination of settings.

7.5.3.1 Server socket details

On some the RIP platforms, the **Socket type** control allows you to choose from `TCP by number`, `TCP by name`, and `Local`. The only option available on all platforms is `TCP by number`.

The `TCP by number` and `TCP by name` options both offer full network access. The options are equivalent in that both identify a numbered port. The only difference is that if you give a name, the name is used to look up the number in the services database, a file which links numbers with names.

A `Local` socket works only with the UNIX operating system and only on the host machine: that is, where the sending application and the Harlequin RIP

both operate on the same machine. It is provided only for compatibility with older systems.

Server Socket type

Choose `TCP by number` or `TCP by name` for use across a network (including from the host machine), and enter the corresponding port name or number in the **Address** box.

Under the UNIX operating system, you can also choose `Local` but do so only where absolutely required by the sending application and enter a socket file name in the **Address** box.

Address

There are up to three possible entries in this box, depending on the choice made for **Socket type**, which itself may be limited by the platforms on which the RIP and the sending applications operate.

When **Socket Type** is `TCP by number`, enter the number of the port.

The socket plugin listens on the chosen port.

When **Socket Type** is `TCP by name`, enter the name of the service.

The socket plugin gets the port number by looking up the name in the services database (`/etc/services` or an equivalent file), and listens on the chosen port.

When **Socket Type** is `Local`, the socket communication is made by using a socket-style file on the file-system. Enter the file name in the **Address** field.

7.5.3.2 Bi-directional communications and protocol

These check boxes allow you to specify if and how the Harlequin RIP should return information to the application sending a job.

Bi-directional comms

Select this box when you wish the RIP to pass responses back to the sending application. The RIP passes these responses: on the server socket when **Use Separate Output Socket** is not selected; or on the output socket when **Use Separate Output Socket** is selected (in which case, you must also configure the **Output Socket Details**).

Use Separate Output Socket

Select this box to use a separate output socket for responses from the RIP to the sending application. You must use a separate output socket if the sending application(s) cannot accept responses on the channel used to send jobs.

This box is irrelevant if **Bi-directional comms** is not selected.

Note: When this option is selected and a port with the same address is used, a `Duplicate Socket Address: already in use` error message will appear and the input will not start.

Use Xinet protocol *(not present on Classic Macintosh computers)*

Do not select this option unless you know that all the sending machines are using the Xinet PapConnect protocol. In particular, Classic Macintosh computers cannot use PapConnect. Also, we recommend that you use this option only for downloading fonts; for general use, leaving this box unselected gives faster transfer rates.

7.5.3.3 Output socket details

These details are only relevant when you have selected the **Use Separate Output Socket** box and the **Bi-directional comms** box.

Choose these values in the same way as for the server socket, described in “Server socket details” on page 293. You must choose a different **Address** from the one chosen for the Server socket. It is convenient but not essential to use the same socket type to make it obvious whether or not the addresses are different. For example, choose numbered addresses that differ by 1.

Note: The sending application can continue to listen on the RIP output socket after it has closed its sending socket. (“Sending machines” on page 292 explained why it is advisable to close the sending socket—the one connected to the RIP Server socket.)

7.6 Using the Asynchronous Socket plugin

The asynchronous socket input is not for use as a source of routine jobs. It is a special case of the socket plugin, designed to run jobs immediately—regardless of what the RIP is already doing. This input provides a way of controlling and monitoring the RIP from without using menus and dialog boxes.

These jobs are restricted in what they can do if jobs from other inputs are to have the intended result. To prevent unintended interaction with a running jobs, each job submitted to the asynchronous socket input should start by performing a `save` and end with a `restore`. Also, the job should not use any painting operators or otherwise alter the graphics state.

Permissible tasks—those that do not interfere with other jobs at the interpretation stage—include querying the availability of fonts and manipulating page buffers in the throughput system.

The one exception where interference with another job is allowed, and necessary, is that it is possible to kill the currently running job.

7.6.1 Creating an asynchronous socket input

It is possible to create an asynchronous socket input in the Input Controller, and subsequently to edit or delete it.

Note: The expected way of creating an asynchronous socket input is by including PostScript-language statements in the files that the RIP executes when starting up. An asynchronous socket input created this way is likely to

be a protected channel, optionally viewable in the Input Controller but not editable.

To create and configure an asynchronous socket input:

1. Click **New** in the Input Controller. The RIP displays the Input Channel Edit dialog box.
2. Choose `SocketInputAsync` from the **Type** drop-down list. Give the input a suitable name and select a page setup. Select the **Enabled** box.
3. Click the **Configure** button. The Socket Configuration dialog box appears. Make the settings you wish, and click **OK**. (See Appendix 7, "Configuring a Socket input plugin" for details.)
4. Click **OK** again to close the Input Channel Edit dialog box. The asynchronous socket input becomes active, as you click **OK** or when you next start inputs.

All other aspects of its use and configuration are as described in Section 7.5 on page 288.

7.6.2 Sample job

This example shows how a short PostScript-language job can kill the current job.

```
% This code kills the currently running job.
//errordict /interrupt get exec
```

7.7 Using the Asynchronous Socket Quit plugin

The `SocketInputQuit` type is a special case of the asynchronous socket input, with the single purpose of causing the RIP to quit. Connecting to a socket of this type makes the RIP quit without the need to send a PostScript-language job containing the appropriate commands.

To create an input of this type, follow the procedure for the asynchronous socket, described in Section 7.6.1 on page 296, but choose `SocketInputQuit` in the **Type** drop-down list.

You can select any page setup for use with this input. There is no need to specify a return channel.

7.8 Using more than one method

The RIP can use any combination of the above input types and listen on all active inputs. When several inputs want to send data, only one job can reach the RIP at a time but the other inputs may be able to receive and buffer data for later rendering.

To accept input from several sources, create and enable the sources you want in the Input Controller. The RIP automatically monitors all enabled sources as soon as the input system is started with the **Start Inputs** menu option.

7.9 Using the Print File command

The RIP supports both the **Print file** menu option, and drag and drop printing from the Macintosh Finder. For details of drag and drop printing, see Section 7.9.1 on page 300.

When you select **Print File** from the **Harlequin RIP** menu, the dialog box shown in Figure 7.6 appears.

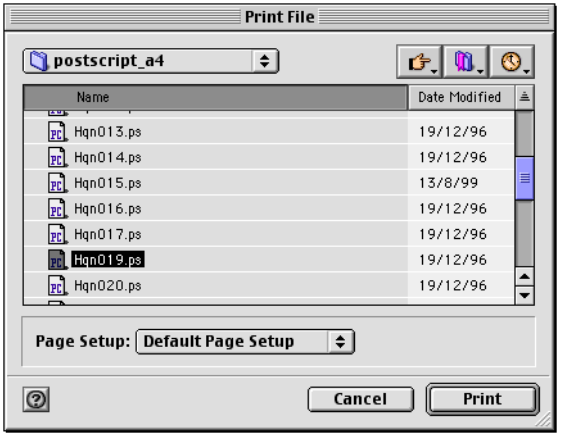


Figure 7.6 Print File dialog box

Choose an appropriate page setup for printing the files, from the **Page Setup** pop-up menu.

Note: If you do not choose a page setup, the RIP uses the one that you chose last time you printed a file. If you have not printed a file in this RIP session,

the first page setup in the pop-up menu is used. To change the order of this listing, see “Reordering page setups” on page 117.

The Print File dialog box shows all files in the current folder.

If you want to choose a file that is not in the folder shown, use the dialog box to move to the correct folder.

You can print a one or more files in a folder. To do this use the following instructions:

- To print any single file, select it in the list box and click **Print**. To enter a folder, select it and click **Open**. (The button changes its label, depending on whether you have selected a file or a folder.)
- To move to a folder higher up in the file structure, choose the folder you wish to move to from the pop-up menu above the list box.
- To move to another drive, press the Hand icon button—the list shows the contents of the desktop, including any other drives (such as floppy disk drives or external file servers).

While any file is being processed, an additional **Print File** menu appears on the menu bar.

You can abort the current job by choosing **Kill Current Job** from this **Print File** menu or by typing Command–• (a period character).

When **Kill Current Job** is selected, the current job is stopped but subsequent jobs will be processed.

By selecting **Stop Printing File**, the current file will complete but any jobs queued after the current job will not print.

Selecting **Abort Printing File** will stop the current job and also stop all subsequently queued jobs from ripping.

7.9.1 Drag and drop printing

From the Macintosh Finder, you can drag a file and drop it onto the Harlequin RIP icon to print the file. You can also drag a folder onto the Harlequin RIP icon to print all printable files in that folder.

When printing a dropped file, the RIP always uses the page setup at the top of the list in the Page Setup Manager dialog box. You can reorder this list, so the top page setup is not necessarily the one named `Default Page Setup`.

If the RIP is not running, it starts up automatically but requires you to dismiss the copyright and trademark notices.

If the RIP is already running, it prints the file(s) as soon as possible, subject to finishing other jobs or you closing any dialog boxes that prevent the RIP from producing output: the Page Setup Manager is an example of such a dialog box.

7.9.2 Printing several files

To print out several files at once, select more than one file from the Print File dialog box before clicking **Print**. The following key makes this possible:

Shift

You can select as many files as you wish by selecting the first file, then selecting any other files while holding down the Shift key.

Note: The list of files to print can include files other than PostScript-language, PDF files, TIFF 6.0, and TIFF/IT-P1. The RIP ignores types of files that it cannot print.

7.10 Printing PostScript-language files

The RIP can print PostScript-language files and Encapsulated PostScript (EPS) files using the **Print File** command or managed inputs. You can also enter PostScript-language code interactively using the **Harlequin RIP > Executive** command.

You can submit PostScript-language jobs to the RIP using any of the managed input methods: AppleTalk, Spool Folder, sockets, and serial input.

The Page Setup Options dialog box provides several options that tailor the way the RIP processes jobs. Some options provide compatibility with jobs using PostScript LanguageLevel 2 or LanguageLevel 1, or produced by specific applications. Other options deal with more general fault conditions or are convenience features. For example, some PostScript-language file formats, such as EPS, do not always include a `showpage` operator at the end of jobs. One of these options adds `showpage` to the end of a job, if necessary. See Section 4.3 on page 119 for details.

When ColorPro is enabled, the RIP can detect and utilize an ICC profile embedded in an Encapsulated PostScript file. See the *Harlequin ColorPro User's Guide* for details.

7.11 Printing PDF files

The RIP can print Portable Document Format (PDF) files that conform to the PDF 1.4 specification or earlier, or PDF/X versions listed below. The PDF Options dialog box allows you to set up strict or flexible workflows using these versions of PDF jobs. The Harlequin RIP support for PDF 1.4 includes: transparency, JBIG2, 128 bit encryption, output intents, and referenced PDF.

Note: RIP versions 5.3 and 5.5 included support for PDF/X-1:1999, this has been dropped in the Eclipse Release of the Harlequin RIP, and replaced with support for PDF/X-1a:2001 and PDF/X-3:2002. for more information see Section 7.11.1.4 on page 304.

The Harlequin RIP supports verification of the following PDF/X versions:

PDF/X-1a:2001
: If a PDF/X file nominates itself as PDF/X-1:2001, it is treated as if it were as PDF/X-1a:2001 file

PDF/X-3:2002

The "PDF Options" from the page set up manager allows the user to select from a range of PDF/X verification settings, see Section 7.11.7.2 on page 314

The aim is to reproduce with high quality all the features of PDF files that can be rendered on paper or film. You can also preview pages printed from PDF

files, but the RIP does not provide a fully interactive hypertext viewer or editor: there are no search, cross-reference, or annotation facilities.

Note: PDF/X is a standard defining a subset of PDF, designed for trouble-free use where the creator sends the PDF file to an external printer or other prepress consumer. For example, a PDF/X-1 file can use OPI references to external file types only if a file stream of that external file is included in the PDF/X-1 file. Another example is that a PDF/X-1 file cannot use some color spaces (for example, DeviceN) that are allowed in PDF version 1.3. See below for more information.

Note: A PDF/X-3 file containing an `OutputIntents` dictionary will be color managed using the ICC profile indicated by the `OutputIntents` dictionary as long as the job uses a device independent color space and the **Override color management in job** option is not selected. Fore more information see Section 7.11.1.1 on page 303.

7.11.1 PDF/X standards

With the growth in the use of PDF for transferring graphic arts content files between sites and between companies it is clear that the flexibility of the PDF format does not allow robust and predictable exchanges of prepress data.

To overcome this problem a family of standards has been developed to define restrictions on the content and use of PDF files to make PDF output more predictable.These standards are collectively called PDF/X, each with a suffix to differentiate the specifications defined for different sets of market needs.

The PDF/X standards defines the elements that must be included in a PDF, and those that must not.

PDF/X-1a:2001 is designed to provide the most robust and, to some extent, least flexible delivery of PDF content data. It requires that the color of all objects be expressed in CMYK or spot colors, prepared for the intended printing conditions. Elements in RGB or Lab color spaces or tagged with ICC profiles are prohibited. It also requires that all fonts used in the job be embedded in the supplied PDF file.

PDF/X-3:2002 allows slightly more flexibility in that color managed workflows are also supported—elements in Lab, and with attached ICC source profiles may also be used.

The specifications also set out how a PDF/X file should be processed by the receiver of the file. If different approaches to overprinting, for instance, are taken at different sites then it will not be possible to predict the exact appearance of the final printed piece from a pre-transmission proof.

This section describes how a Harlequin RIP should be configured in order to produce PDF/X-1a and PDF/X-3 compliant output.

Default RIP settings will produce output conforming to both the PDF/X-1a:2001 and PDF/X-3:2002 standards. No explicit configuration changes are required.

7.11.1.1 PDF/X Color management

PDF/X files all include data describing the characterized printing conditions for which the job was prepared. That data is collectively described as the output intent. It includes an identifier that may refer to a characterization held in a registry maintained by the ICC (International Color Consortium). In many cases the output intent will also include an embedded profile to support accurate color proofing, both on screen and on hard copy.

The ColorPro™ option can be used to perform in-RIP color management with the Harlequin RIP. It can be used for many purposes, including color proofing, or for adjusting plates to enable a press to better match a characterized printing condition such as SWOP. For more information see the ColorPro™ documentation.

7.11.1.2 Trapping

The TrapPro™ and TrapProLite™ options add in-RIP trapping functionality to the Harlequin RIP. If these have been enabled, trapping parameters may be defined in the user interface and automatically applied to all jobs submitted to the RIP. If a PDF or PDF/X file is labeled as having already been trapped (by setting the Trapped flag to True), the in-RIP trapping will automatically be disabled while processing that file to prevent traps being applied twice.

For more information see the TrapPro™ documentation.

7.11.1.3 Workflow notes

When processing PDF/X files it is important that your whole prepress workflow provides a result that complies with the standard, including placement of partial-page submissions on a page and so on. You should also test all routes by which an incoming file may pass through your complete workflow. Tools such as the Kensington Suite and the Global Graphics PDF/X Overprint test strip can assist in this testing. see the Global Graphics web site for for more information.

7.11.1.4 PDF/X-1:1999 and PDF/X-1:2001 compatibility

Versions 5.3 and 5.5 of the Harlequin RIP included explicit support for the older ANSI/CGATS PDF/X-1:1999 standard rather than the current ISO versions. That explicit support has been removed for the Eclipse Release. No explicit support for the PDF/X-1:2001 conformance level (note the absence of the "a" after the "X-1") has ever been included in the RIP.

The Harlequin RIP will correctly process PDF/X-1:1999 and PDF/X-1:2001 files if supplied, including embedded, OPI-referenced image files. It will, however, be necessary to manually configure overprinting settings to obtain correct output. No validation of the files against the standard will be applied.

7.11.2 Printing PDF version 1.4

There are a few applications that can save files in version 1.4 of the Portable Document Format (PDF), these include Jaws PDF Creator, Illustrator 9 and 10®, Acrobat 5®, InDesign™ 2.0 and Photoshop 7.0.

One of the major features of this new revision is the ability to mark objects as being partially transparent, so that other objects in the background are visible through them. This feature aids the creation of many special effects, including drop shadows, ghosting back of image areas behind text blocks and soft edges to silhouetted pictures.

7.11.3 Working with transparency

In the Eclipse Release of the Harlequin RIP, the “InstallInFlight” procedure has been withdrawn and replaced with “InstallTransparencyCheck” and a “BackDropRender Selector”.

A number of switches are available and the following messages will appear depending on the switch settings:

7.11.3.1 PDF Check Warning

With PDF Check Warning enabled the following message appears at the start of every PDF job using transparency:

```
%%[ WARNING - THIS JOB USES PDF 1.4 TRANSPARENCY ]%%
```

This message indicates that the PDF 1.4 transparency checker procset has identified an element marked as transparency in the job. The procset then switches the RIP from “Normal” mode into “Backdrop Rendering” mode.

Normal mode means the RIP functions normally, and you should not notice any significant changes in behavior in terms of performance, memory usage and so on.

In Backdrop Rendering mode there are significant changes. Interpretation time will be broadly similar as in normal mode however rendering time will be increased. This is because the RIP does the compositing in the render phase and this process is computationally intensive. The compositing phase currently requires memory to be allocated and so `vmerrors` may occur. In terms of results, the objects are composited at full device resolution, there is no downsampling like that produced by pre-flatteners. Areas of the page which have only opaque objects are optimized to render faster and thus performance depends on how much of the page is covered by objects which are transparent.

7.11.3.2 PDF Check Abort

With the PDF Check Abort switch enabled all jobs using transparency will be aborted and the following message is displayed:

```
%%[ WARNING - THIS JOB USES PDF 1.4 TRANSPARENCY - ABORTING JOB ]%%
```

7.11.3.3 PDF Page Alert

With the PDF Page Alert switch enabled the following alert appears when interpreting every page that uses transparency:

```
%%[ THIS PAGE USES PDF 1.4 TRANSPARENCY ]%%
```

Using the page-by-page check allows the RIP to switch between Normal and Backdrop Rendering mode on a page by page basis. This improves performance because backdrop rendering a page containing no transparency is much slower than normal rendering.

Note: When a PDF file references another PDF file via transparency the second PDF is now checked while determining if the page containing the reference has any transparent object on it.

Also, not all applications that provide a user interface to define “transparency” do so using PDF 1.4 structures. Macromedia FreeHand has support for transparency, but it is done in a different way. Also Acrobat Distiller® cannot make transparent objects.

For more information see the *Harlequin RIP Extensions manual*.

7.11.4 AcroForms

A PDF file can contain information which is additional to the standard PDF format. When viewed using an interactive application such as Adobe Acrobat, this additional information provides interactive features making the page more like a form. These files are called *AcroForms*.

With features such as text input fields, multiple choice option lists and clickable buttons, a PDF file that features an AcroForm is used to provide comprehensive electronic form filling functionality.

You interact with the form via the usual mouse and keyboard actions. The AcroForm can be programmed to respond to events (such as clicking on a button) to provide various levels of automation.

7.11.4.1 Print Ready PDF AcroForm files

An AcroForm is generally created for interactive use via an interactive program like Adobe Acrobat. However, you may want to print these files. The Harlequin RIP is, of course, not interactive and is only concerned with rendering the contents of the PDF file for printed output. This creates a number of issues about exactly which of the essentially interactive features (such as, buttons and lists) should be printed and how they should appear.

When the form is completed (that is, all the required text input fields are filled in) using Adobe Acrobat, the PDF file is re-saved by Acrobat to save the entered information. When this is done, Acrobat creates additional content in the PDF file called *Appearance Streams* which render the filled-in text input fields. It also marks the PDF file's AcroForm as being "complete" (by setting the **`NeedAppearances`** key in the AcroForm dictionary to **`false`**).

We refer to a file that has been completed in this way as being *print-ready*.

Prior to being made print ready, a PDF AcroForm may be incomplete to various degrees. For example, the form could be blank in the sense that none of the fields contain any user-entered information. Alternatively, a PDF AcroForm file could have been partially completed by a database program (for example) which can provide values (content) for some or all of the text input fields but still not yet completing the file. This completeness refers to two things:

- The fields' appearance streams may not be present in the PDF file, even though the fields may have been given values (that is, the actual text to display in the input fields).
- The AcroForm will be marked as incomplete by virtue of the **`NeedAppearances`** key in the AcroForm dictionary being set to **`true`**.

When the Harlequin RIP is given the job of printing a PDF AcroForm, it has to be sensitive to whether or not the form has been *completed* and is *print-ready*.

The Harlequin RIP uses the following rule:

- If the **`NeedAppearances`** key in the AcroForm dictionary (in the PDF file) is **`false`** (or is absent), the AcroForm will be printed such that all fields (and only those fields) with appearance streams given will be displayed. Otherwise, if **`NeedAppearances`** is **`true`**, the Harlequin RIP will reconstruct appearance streams for all the fields it finds.

What this means for the Harlequin RIP is that, unless the PDF file has been made complete and print-ready, the final appearance of the various fields of the AcroForm could be displayed slightly differently than they might appear in the viewing application (for example, Acrobat).

7.11.4.2 PDF AcroForms and the Harlequin RIP

When a PDF AcroForm has been completed and saved and is therefore print-ready, the Harlequin RIP will print all AcroForm field types (text fields, choice list boxes, buttons, and signature fields). However, this is conditional upon the manner in which the fields have been defined in the AcroForm. For example, some button fields may have been flagged (by Acrobat) as "not to be printed". In this case the Harlequin RIP will not print such items.

If the PDF AcroForm has not been saved as print-ready, the Harlequin RIP still supports the rendering of text input fields (both single-line and multi-line).To do this, the RIP constructs (or reconstructs) the fields' appearance streams according to the field values and other information contained within the AcroForm. It should be noted however that there is a degree of licence with respect to how a viewing application may format the items (such as text and buttons), and so results between different viewing applications may differ.

If the AcroForm is not print-ready, the Harlequin RIP also attempts to support other field types (such as buttons and choice lists) but their final appearance may be different to the intended result (by a greater or lesser extent). It is therefore highly recommended that all AcroForm files to be submitted to the Harlequin RIP are saved as print-ready first.

7.11.4.3 Implementation of PDF 1.4 Annotations

Support for PDF Annotations, as defined in the PDF 1.4 specification, is implemented in the Harlequin RIP. Annotations are defined in section 8.4 of the specification, however, they also refer to AcroForm fields (which merge with annotation “widgets”). AcroForms are defined in section 8.6 of the specification entitled “Interactive Forms”.

Support for AcroForms has already been implemented for PDF 1.3.

Most PDF Annotation types are supported as long as they meet the following conditions:

- their “Normal” appearance streams are present and correct in the PDF file and,
- they have their “Print” flag set.

Excluded annotations are:

- Link and Movie annotations, because they do not present a normal appearance stream in the standard way
- Popup annotations, because they only apply to interactive applications (that is, popping up a window)
- TrapNet (also known as, trap network) annotations.

Note: From Eclipse Release SP3 the RIP ignores (in non-strict mode only), PDF documents with “FreeText” type annotations which contain invalid PDF content.

7.11.5 Enfocus preflight checking of PDF files

From the Eclipse Release SP3 a mechanism is provided to upload and install certified PDF profiles to the RIP allowing certification checks to be performed on incoming PDF documents. Profiles must be added to the RIP by using the PDF Profile Manager. Using this method, the PDF Profile manager can perform various consistency checks.

On import of a profile the PDF profile manager will:

- check whether the file to be imported is a valid PDF profile.
- not allow two file names with the same PDF Profile name to co-exist.*

- alert if a file is overwritten.
- alert if a file overwritten and the new file refers to a different profile.

On deletion of a profile the PDF profile manager will:

- not allow the deletion of a PDF profile that is referred to by a Page Setup.

*Through the PDF Profile manager files are imported or deleted. A valid file, exports a PDF Profile name which is not necessarily the name of the file.

A page setup can refer to a number of profiles. And the same profiles can be used in different page setups.

7.11.5.1 Importing PDF profiles

To import a PDF profile:

1. Select **Output >PDF Profile Manager....** This displays the following dialog:

Figure 7.7 PDF Profile Manager Dialog

2. Click **Add** and navigate to the location of your profile and select it.
3. Click **Done**.

To remove a PDF profile:

1. Select **Output >PDF Profile Manager....**
2. Highlight the profiles to be removed. Only those profiles not currently being used by page setups can be removed.

3. Click **Remove** followed by **Done**.

For more information see Section 7.11.7.6 on page 317.

For more information on PDF profiles, see **http://www.certified-pdf.net/home.php**.

7.11.6 Related documentation

The following documents may help you understand AcroForms:

- *Graphic technology—Prepress digital data exchange—Use of PDF for composite data—Part 1: Complete exchange (PDF/X-1)*, American National Standard CGATS.12/1-1999. This document is available from NPES; see **http://www.npes.org/** for purchasing details.
- *Portable Document Format Reference Manual*, Version 1.4. Adobe Inc.
- *Harlequin ColorPro User's Guide*, Global Graphics Software.

7.11.7 PDF Options dialog box

Figure 7.8 shows the dialog box that appears when you click **PDF Options** in the Edit Page Setup dialog box. (This view shows some settings that are not at their default values.)

If you need to print PDF files with different options, for example with different passwords, you can create a number of PDF page setup configurations.

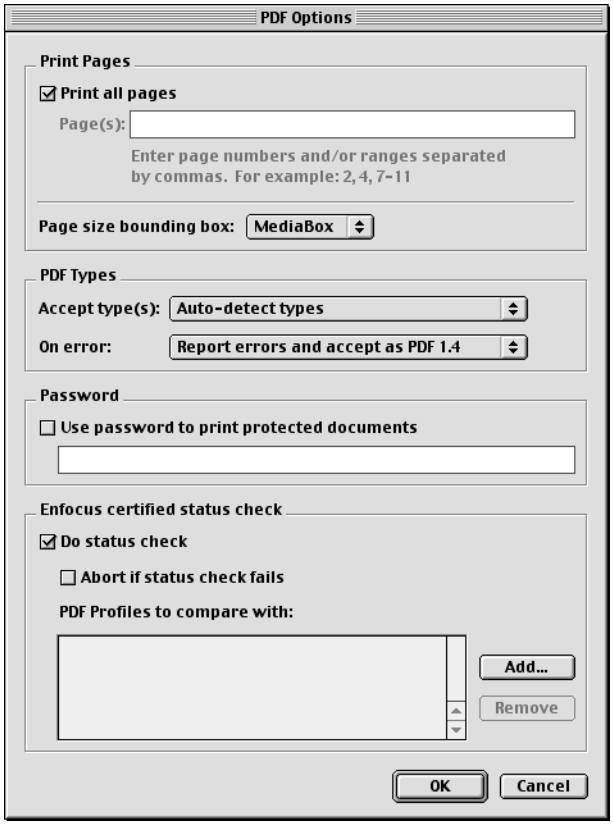


Figure 7.8 PDF Options dialog box

The options are in sections for page selection, PDF type acceptance, passwords and Enfocus certified status check for preflight checking of PDF files.

7.11.7.1 Page selection

Print all pages

Leave this check box selected to print all the pages in the PDF document. If you wish to print only a subset of the pages from a PDF job, deselect this check box and enter the desired pages in the **Pages** field.

Reselect this check box when you have finished printing the subset of pages. This enables the printing of all pages from other PDF jobs. (You do not need to delete the entry in the **Pages** field.)

Page(s)

Enter numbers for the page or pages that you wish to print. You can enter individual page numbers or ranges, separating each number or range with a comma (,) character.

To enter a page range, enter the numbers of the first and last pages in the range, using a hyphen to separate them: for example, `7-16`. If you wish to print all pages from a particular page to the end of the job, enter a range starting with that particular page and ending with a number that you know to be higher than the last page in the PDF job: for example, `47-10000`.

You can combine individual page numbers and ranges: for example, `1,2,7-16,23,24`.

When printing a PDF job, the RIP displays a message for each page that is not printed because of being unlisted in this field. This is a typical message:

```
%%[ Warning: Skipping page 1 - not in requested page range ]%%
```

Page size bounding box

PDF version 1.3 offers several options for defining a rectangular area that is the area of interest for a PDF page. A PDF file may set values for one or more of these areas, to be used as appropriate to the different ways that the PDF file can be used: viewing, office printing, imposition, commercial printing, and so on.

The RIP looks for the values of the option chosen in this list and makes a page buffer of the size set by that option. Only `MediaBox` must be present in a file, but the other areas inherit default values from `MediaBox`.

The options in this list are fully defined in the *Portable Document Format Reference Manual*, Version 1.3. The default is `MediaBox`.

`MediaBox`	The size of the media, which may be larger than the page imaged upon it.
`BleedBox`	The size of the page whose edges must be reached by bleed objects, though the trimmed size of the page may be smaller. There may be printer's marks and parts of the bleed objects outside this area.
`TrimBox`	The size of the page as intended for delivery to the reader, after trimming any printer's marks and excess bleed areas.
`ArtBox`	The size of the rectangle to be used when placing a PDF graphic. (Typically, this is the bounding box of the graphics plus a possible allowance for captions or blank margins.)
`CropBox`	Rectangle specifying the default clipping region for the page when displayed or printed. Acrobat Exchange sets this when cropping a page.

7.11.7.2 PDF Types

By default all PDF files will be accepted by the RIP, whether they conform to the PDF/X standards or not.

The RIP will recognize PDF/X-1a and PDF/X-3 files, apply the necessary additional checks to validate that they comply with the full details of the standard, and automatically change any configuration settings (such as overprinting) that do not match the requirements for rendering them correctly.

Accept type(s)

This list allows you to define how strictly the PDF file must conform to various standards and specifications for PDF jobs. You can use the **On error** list to define what the RIP should do if the job does not meet the requested specification.

The options in this list are as follows:

`Auto-detect types`

This is the default option. The RIP makes the best possible attempt to print the file according to the type labeling within the job. PDF/X files will be recognized automatically. If the job claims to be PDF/X-1 but does not meet that standard, the RIP treats that as an error but may still be able to print the file.

`Any PDF <= 1.4 as basic PDF`

All PDF and PDF/X files will be accepted, with no special treatment of PDF/X files. With this setting the RIP will print any job with a recognized PDF version; that is, version 1.4 or less, including non-compliant jobs labeled as PDF/X-1 but not actually complying with the standard. This is the most relaxed setting.

`Only PDF/X-1a:2001`

Only PDF/X-1a files will be accepted. See below for the action taken when other files are received. If the file does not name itself as PDF/X-1a:2001 (or PDF/X-1:2001), treat it as less than PDF 1.3.

`Only PDF/X-3:2002 or X-1a:2001`

Only PDF/X-3 and PDF/X-1a files will be accepted. See below for the action taken when other files are received. PDF/X-1a is a subset of PDF/X-3 and anyone accepting PDF/X-3 should also accept PDF/X-1a. If the file does not name itself as PDF/X-3:2002 or PDF/X-1a:2001, treat it as less than PDF 1.3.

On error

The options in this list define the action you wish to occur if there is an error: for example, if the PDF file is an unrecognized type or if it fails to meet the condition set in the **Accept type(s)** list. The actions are as follows:

`Report errors and accept as PDF 1.4`

Report errors and print the job as if it is PDF version 1.4. The errors reported are for the type as explicitly set in the **Accept type(s)** field or as detected when the setting is `Auto-detect types`. There may be problems with the printed results if the job is newer than version 1.4 or badly constructed.

Any PDF/X validation errors will be reported in the RIP's system log, but the file will still be processed and output.

`Reject if invalid PDF type`

Report errors and reject (abort) the job. If a file being processed does not conform to the file type selected, the job will be aborted—no output will be produced.

Where a condition in the PDF file is encountered which does not conform to the appropriate PDF/X specification, a warning message is displayed.

Unless you have selected the `Reject if invalid PDF type` option, processing of the PDF file continues as normal.

7.11.7.3 Proofing and validation

The RIP may be used as a combined PDF/X validation and proofing tool by selecting one of the PDF/X entries in the **Accept type(s)** menu, and Reject if invalid PDF type in the On error menu.

7.11.7.4 Non-conforming rendering

To force the RIP to apply your own configuration (for example, overprint settings), to a PDF/X file; select `Any PDF <= 1.4 as basic PDF` in the **Accept type(s)** menu. This option may also be used to print a file that claims to be PDF/X compliant, but that does not correctly conform to the standard.

7.11.7.5 Password

Use password to print protected documents

Select this option when you wish to print a document that has been protected by a password, and enter that password in the text field. Enter one password only.

For maximum security, remove the password after use. This removal is optional if your other PDF jobs do not have password protection.

Note: The PDF specification allows for files to have Owner and User (reader) passwords. The RIP checks the password that you enter against both of these passwords, and allows printing if either password produces a match.

Passwords can be any length but only the first 32 characters are significant. If you have any way to influence the choice of password used in jobs supplied to you, suggest that it uses only ASCII characters: the letters `A-z` and `A-Z`, the numerals `0-9`, and punctuation marks such as `[]{}` and `;`. For example, there may be problems in entering the password if the password uses characters that are not in the English alphabet. Avoid multiple white space characters, accented characters, and characters that require a double-byte representation.

Note: The **Honor 'PDF Color Management'** check box has been removed. The option is now called **Override color management in job** and is part of the **Input Document Controls** within the **Color Setup Manager**. See Section 11.8 on page 450 for more details.

To make fullest use of jobs containing device-independent color definitions, enable a TrapPro option in the Configure RIP Extras dialog box.

7.11.7.6 Enfocus certified status check

The purpose of the Enfocus certified status check is to determine if incoming PDF documents contain an Enfocus certificate having previously passed (or failed), a preflight check using the same profile, prior to reaching the RIP. If a PDF document passes the check, the RIP monitor reports:

```
StatusCheck: document '<path/name>' certified
```

If a document fails the check, the RIP monitor reports:

```
StatusCheck: document '<path/name>' not certified
```

This check allows you to ensure the validity of the incoming jobs and as such be sure the files are passed successfully along the workflow.

The following options are provided:

Do status check

With this option selected each incoming PDF is compared to the PDF profiles listed in the **PDF Profiles to compare with** window. When a file passes the test it will continue processing. When a file fails the test a message is displayed in the message window and written to the log file. The file will then continue processing unless the **Abort if status check fails** option is checked.

Note: When **Do status check** is selected you must have at least one profile listed before you can close the PDF options dialog.

Abort if status check fails

PDF jobs that fail the test are still processed unless the **Abort if status check fails** option is selected, in which case they are aborted.

PDF Profiles to compare with

Use the **Add** and **Remove** buttons to add or delete PDF profiles which have previously been imported to the RIP. For more information on importing PDF profiles see Section 7.11.5 on page 309.

A page setup can refer to one or more profiles. And the same profiles can be used in different page setups.

7.11.8 Usage

The simplest way to use PDF files is using the **Harlequin RIP > Print File** command. Select the page setup that sets the correct PDF options from the **Page Setup** pop-up menu.

You can also supply PDF files to the RIP using spool folder inputs and all forms of network protocols: AppleTalk, sockets, and so on. See the summary of managed inputs in Section 7.1 on page 274. If necessary, set the PDF options in the page setup corresponding to your chosen managed input.

7.11.9 Limitations and special treatment

The RIP can always print PDF files that are designed to be printed. There are some minor differences compared to the way in which the RIP handles PostScript-language files. Also, the emphasis on printed output and limited interactivity means that the support of some optional content in PDF files is missing or modified, compared to the support in a dedicated PDF viewer.

These features are:

Embedded fonts and font substitution

The Harlequin RIP supports the use of fonts embedded in PDF files as well as fonts already available to the RIP for use with PostScript-language jobs. The embedded fonts can include TrueType (Type 42) fonts, CID (character identifier) composite fonts, and Compact Font Format (CFF) fonts.

When fonts requested by a PDF job are missing, the RIP obeys the setting of the **Abort the job if any fonts are missing** check box in the Page Setup Options dialog box.) See Section 4.23.8 on page 198 for more information.

Security settings

The creator of a PDF file can limit access to a PDF file, by requiring a password of the reader or forbidding changing, copying, or printing of the content. The only function relevant to the Harlequin RIP is the ability to forbid printing. In general, the RIP does not print files where the creator has forbidden printing.

Document Information

The RIP Monitor window displays the PDF version number and general information about the document, as supplied by the author or creating application.

Most PDF Annotation types are supported but only if:

their "Normal" Appearance streams are present and correct in the PDF file; and they have their "Print" flag set.

Excluded annotations are:

Link and Movie annotations, because they do not present a normal appearance stream in the standard way.

Popup annotations because they only apply to interactive applications (that is, popping up a window)

TrapNet (also known as, trap network) annotations.

Extensions — The RIP ignores all extended content (for example, multimedia content and private data) that is labeled as such according to the PDF specification.

7.12 Printing JPEG and JFIF files

The RIP can print JPEG and JFIF files using the **Harlequin RIP > Print File** command, or from a spool folder.

The simplest way to print JPEG and JFIF files is using the **Harlequin RIP > Print File** command.

You can also supply JPEG and JFIF files to the Harlequin RIP using spool folder inputs. See Section 7.4, “Using the Spool Folder input folder” for details.

When ColorPro is enabled, the RIP can detect and utilize an ICC profile embedded in a JPEG file. See the *Harlequin ColorPro User’s Guide* for details.

7.12.1 Limitations

A JPEG file in Progressive format (a format option in Adobe Photoshop) cannot be printed by the Harlequin RIP. Progressive format is often used for web downloads.

7.13 Printing GIF files

The Harlequin RIP can print GIF (Graphics Interchange Format) files using the **Harlequin RIP > Print File** command, or from a spool folder.

The easiest way to print GIF files is using the **Harlequin RIP > Print File** command.

7.14 Printing TIFF/IT files

The Harlequin RIP supports the imaging of TIFF/IT Profile 1 files, generally referred to as TIFF/IT-P1 files, a common method of transferring images for use in advertising.

This section summarizes the history of the file format and its uses before describing how to enable and use imaging of these files in the RIP. The description of use starts with Section 7.14.2 on page 323. See also “Printing TIFF 6.0 files” on page 326.

7.14.1 General

The Tag Image File Format (TIFF) is a well-established and popular file format for raster images. There have been a number of published standards for the format of TIFF files, each successive standard generally being more complex than the last. This growing complexity has reflected the format increasing in flexibility and providing for private extensions to the format. The result has been that TIFF now represents a family of file formats and there are many programs that implement only the more popular parts of these formats.

The RIP supports the imaging of TIFF/IT Profile 1 files, generally referred to as TIFF/IT-P1 files, a common method of transferring images for use in advertising. The International Standards Organization (ISO) Draft International Standard 12639 describes the TIFF/IT and TIFF/IT-P1 formats. Relevant earlier standards are ANSI IT8.8 and the Aldus TIFF 6.0 standard (now maintained by Adobe).

The TIFF/IT-P1 format is being promoted by a body called Digital Distribution of Advertising for Publications. It provides a clean interface for the proprietary color electronic prepress systems (CEPS) formats such as the Scitex CT/LW format.

TIFF files can contain many different types of data but, in general, a single TIFF/IT-P1 file contains only one kind of data from a total of six possibilities, each known by a two-letter abbreviation as listed in Table 7.1.

The exception is the FP file, which includes layout information and the details of some combination of files, each containing CT, HC, or LW data—it is convenient to call these other files *subfiles* of the FP file. The data may appear in any order within the FP file but applications must image it in a set order.

There must be at least one subfile in an FP file, but no more than one of each type. For example, an FP file cannot contain more than one CT file and it is typical for FP jobs to contain only a CT subfile and an LW subfile.

The full list of data types with their typical uses is:

Table 7.1 TIFF/IT data type codes and usage

Data type	Usage
FP	Final Page (layout for CT, HC, and LW)
CT	Contone, typically low resolution
LW	Line Work
HC	High resolution Contone
BL	Binary Line work (not an FP subfile)
BP	Binary Picture (not an FP subfile)
MP	Monochrome Picture (not an FP subfile)

Some of these data types are partly compatible with the corresponding definitions in the TIFF 6.0 standard.

The largest difference with TIFF 6.0 is that TIFF/IT has only one image per file. The FP file format can have up to four Image File Directories (IFDs), but only one image—the preview image for the FP layout.

The major restrictions on TIFF/IT-P1 compared to TIFF/IT are that TIFF/IT-P1:

- Uses CYMK only (when appropriate).

- Is pixel interleaved (when appropriate).
- Has a single choice of image orientation.
- Has a single choice of dot range.

The Harlequin RIP images an FP file by rendering the referenced CT, HC, and LW subfiles, in that strict order. Order is significant because the HC and LW subfile types can include transparent regions able to reveal images rendered from previous subfiles.

When the RIP renders subfiles as part of an FP job, it uses extra information in the FP file to determine the overall size of the page, and position each subfile (which can be smaller) within that page.

The RIP can also image a single CT, HC, or LW file independently of an FP file. For each of these files, the RIP locates the image origin at the PostScript-language origin—relative to coordinates (0,0) at the bottom left of the page. For example, this provides a limited proofing capability but be careful to avoid printing a partial image when the subfiles are available before the FP file.

When ColorPro is enabled, the RIP can detect and utilize an ICC profile embedded in a TIFF file. See the *Harlequin ColorPro User's Guide* for details.

7.14.2 Installation and requirements

You must enable the RIP to print TIFF/IT files, by entering a password or key number issued to you by your supplier. Note that TIFF 6.0 input is always enabled.

1. Display the Configure RIP dialog box and click **Extras**.
2. In the Configure RIP Extras dialog box, select the item `TIFF/IT` in the list.
3. Click the **Add** button. In the Enable Feature dialog box that appears, enter the key number issued to you for use with TIFF/IT, and then click **OK** to return to the Configure RIP Extras dialog box, and **OK** again to return to the Configure RIP dialog box.

If you attempt to print TIFF/IT-P1 files when the `TIFF/IT` option is not enabled, then depending on the input method chosen, the TIFF 6.0 input

option may attempt to process the parts of the file that it recognizes as TIFF. This is unlikely to produce the desired result.

TIFF/IT files can result in very large page buffers and, potentially, cause painting to multiple partial page buffers. We recommend that you allocate 128 MB of memory to the RIP if possible, with an absolute minimum allocation of 64 MB RAM.

It is not possible to run a simple spool folder where any of the CT, HC, LW, or FP files may arrive first: the result may be partial images. The spool folder *can* accept TIFF/IT-P1 files but only if the order of arrival and file naming can be controlled. See page 288 for details of configuring the spool folder for a specially controlled source of TIFF/IT-P1 files. If the order of arrival or naming is unsuitable or unpredictable, using **Print File** from the **Harlequin RIP** menu is the simplest reliable method of ensuring that the RIP images the intended file or combination of files.

7.14.3 Usage

To print a TIFF/IT file, first choose a page setup with a large enough imaging area and an appropriate resolution for the high resolution data types.

Next, choose the option **Print File** from the **Harlequin RIP** menu. Figure 7.6, page 298, shows the dialog box that appears. Display the contents of the folder holding the file that you want to print.

Choose the file that you want to print. Typically, this is an FP file if you are imaging a finished page but you can specify a subfile: for example, to proof it alone. There is no enforced file name convention but the two letters of the data type usually appear in the name.

For the example of a CT file with name *file*, you may see any of:

***file*.ct**
***file*.ict**
***file*.CT**
***file*.ICT**

On Macintosh platforms, the RIP displays all files in the folder without you taking any action.

Select the file you want to print, and click **Print**.

If you are printing an FP file, the RIP displays a progress dial while reading each of the files referenced by the FP file and the RIP Monitorwindow shows text similar to the following example:

```
% tiffdev: reading "H:\Suites\Tiffit\66.fp" as a
TIFF/IT-P1 FP (Final Page) standalone file
Starting Job On 24 April 1998 08:51:42
Using Color Setup "(None)"
Using default device calibration
% tiffdev: reading "H:\Suites\Tiffit\66.ct" as a
TIFF/IT-P1 CT (low-resolution contone) subfile of an FP job
% tiffdev: reading "H:\Suites\Tiffit\66.lw" as a
TIFF/IT-P1 LW (linework) subfile of an FP job
Interpretation time: 40 seconds
. . .
```

If you are printing a subfile (data types CT, HC, or LW), you see less text after clicking **Print**:

```
% tiffdev: reading "H:\Suites\Tiffit\66.ct" as a
TIFF/IT-P1 CT (low-resolution contone) standalone file
Starting Job On 24 April 1998 08:51:42
Using Color Setup "(None)"
Using default device calibration
Interpretation time: 37 seconds
. . .
```

If you attempt to print TIFF/IT-P1 files when the `TIFF/IT` option is not enabled, then depending on the input method chosen, the TIFF 6.0 input option may attempt to process the parts of the file that it recognizes as TIFF. This is unlikely to produce the desired result. See also “Printing TIFF 6.0 files” on page 326. In the following example a TIFF/IT-P1 file is processed as a TIFF 6.0 file.

```
% tiffdev: reading "H:\Suites\Tiffit\test.tif" as a
TIFF 6.0 baseline (with extensions) standalone file
Starting Job On 24 April 1998 08:51:42
Using Color Setup "(None)"
Using default device calibration
% tiffdev: TIFF6: compression is None
% tiffdev: bits per sample = 1
% tiffdev: samples per pixel (planes) = 1 (bilevel or grayscale)
Interpretation time: 0 seconds
. . .
```

However, if the TIFF 6.0 input option does not recognize any part of the file as TIFF, you will see the message:

```
open: the TIFF 6.0 or TIFF/IT file
is either corrupt, unsupported, of an unrecognised
type or the appropriate file type is not enabled
in Configure RIP / Extras
```

The RIP displays the same message if you attempt to image TIFF/IT data types that it does not support or to image files that do not conform to the TIFF/IT-P1 profile.

7.15 Printing TIFF 6.0 files

The RIP accepts TIFF 6.0 baseline files, with the exceptions and extensions listed under Section 7.15.2 on page 327.

This support extends to all TIFF files produced by the Harlequin RIP TIFF output plugin, with the exception of files produced with these settings:

- In the Harlequin RIP version 5.0 through 5.5r0b, where **Style** in the Edit Page Setup dialog box has been set to `RGB Composite (Band)` or `CMYK Composite (Band)`.
- In the Harlequin RIP version 4.5 and earlier, where **TIFF format** in the TIFF Configuration dialog box has been set to `PlanarConf=2/multiple strips`.

Note: From v 5.5r1 the Harlequin RIP can handle `RGB Composite (Band)` or `CMYK Composite (Band)` **Style** but only with the `tiffexec` operator. `tiffdev` still does *not* support these styles.

Note: The Eclipse Release and later RIPs support Palette color (Index color) TIFF files.

7.15.1 Procedures

TIFF 6.0 input is always enabled, but operates only with Spool Folder input and the **Print File** command. (It is also possible to use TIFF 6.0 input from PostScript-language instructions.)

Copy the TIFF file to the correct folder for Spool Folder input, or select it in the dialog box shown when you choose **Print File**. If you use **Print File**, type the file name or make sure that the RIP is displaying all files in the list of files. TIFF files often have the file name extension `.TIF` but this is not required.

This extract from the text displayed in the RIP Monitorwindow shows the messages produced when successfully processing a TIFF 6.0 file.

```
Setup loaded: "tiff"
Ripping file %H%/Suites/PEOPLE/68.tif as TIFF.
% tiffdev: reading "H:\Suites\PEOPLE\68.tif" as a
TIFF 6.0 baseline (with extensions) standalone file
Starting Job On Thursday, January 29, 1998 08:48:48
Using Color Setup "(None)"
Using default device calibration
% tiffdev: TIFF6: compression is None
% tiffdev:        bits per sample = 8
% tiffdev:        samples per pixel (planes) = 4 (CMYK)
Interpretation time: 32 seconds
. . .
```

The remaining text (not shown here) is related to rendering and output, not to the input.

7.15.2 Limitations and extensions

The Harlequin RIP accepts TIFF 6.0 baseline files, with the following differences.

Not supported:

- LAB color.
- Multiple IFDs (images) per file (the RIP images only the first).
- PhotometricInterpretation = 4 (transparency mask).
- PlanarConfiguration = 2 (`tiffdev`). This option is offered by the Harlequin RIP TIFF output plugin, as composite RGB or CMYK output with band-interleaving in the Harlequin RIP version 5.0 and later.

  Note: From Harlequin RIP version 5.5r1 the `tiffexec` operator supports PlanarConfiguration = 2.

  Note: From Harlequin RIP Eclipse Release SP4, 16-bit images are supported.

Ignored:

- GrayResponseCurve.
- GrayResponseUnit.

Restrictions:

- 1, 2, 4, 8, or 16 bits per plane.

Additionally, the RIP supports the following full TIFF 6.0 extensions to TIFF 6.0 baseline:

- CCITT T.4 compression (group 3 2-D) (1 bit per pixel or *bpp*).
- CCITT T.6 compression (group 4) (1 bpp).
- LZW compression, including Differencing Predictor.
- CMYK (including DotRange != 0, 255).
- JPEG compression.

Note: If you are attempting to RIP images which you have prepared using Photoshop and saved using ZIP or JPEG compression, the RIP may generate a `rangecheck` error.

This occurs because ZIP compression is not a recognized TIFF compression format, and as such is not documented in the TIFF 6.0 specification. The JPEG compression that Photoshop uses is a new version of JPEG data in TIFF files which is also not part of the TIFF 6.0 specification.

7.16 Printing page buffer files

The RIP can print page buffer files produced by another similar installation of the RIP. This is a convenient way of setting up a simple workflow able to transfer pages from one RIP installation to another.

One example of how this ability can be useful is where you have several RIPs with a single, fast, final output device, and perhaps various slower proofing printers. It is easy for a single RIP working alone to keep a slow proofing printer supplied with jobs. On the other hand, it may require many of the Harlequin RIPs interpreting jobs and producing page buffers to keep your fast output device busy. One solution is have the interpreting RIPs all pass their

final output page buffers to a single machine running a RIP, whose only function is to accept page buffers and pass them to the fast output device as quickly as possible.

Note: The separate *FlatOut User Guide* describes this situation and other, more complex, possibilities in greater detail.

The method described here is designed for the rerouting of complete and valid page buffers, using **Print File** or spool folder inputs.

7.16.1 Requirements and preparation

There are some requirements on the installations involved and you must prepare the receiving and supplying Harlequin RIP installations before use.

The requirements are:

- The RIP installation printing (receiving) the page buffers must have the same installed version of the same output plugin as used to produce the page buffers.
- This receiving RIP installation must be running in `Multiple` or `Multiple (Parallel)` modes.
- The sending RIP installations must be version 4.5 or later.
- All the RIP installations must be running on the same platform: for example, Macintosh.
- It must be acceptable to have the original page buffers destroyed after output.

The preparation of the receiving RIP installation is to enable use of the `PGB hot folder` page feature and create a page setup. Optionally, you can use the page setup with a spool folder input.

1. Enable the page feature, by copying the `PGB hot folder` file from the `SW/Page Features/Examples` folder to the `SW/Page Features` folder.
2. Create an appropriate page setup and choose the `PGB hot folder` entry in the **Enable Feature** pop-up menu in the Edit Page Setup dialog box.

3. Optionally, if you wish to use a spool folder as input, create a new spool folder input and, in the Input Channel Edit dialog box, choose the page setup that you created in step 2. Configure and name the spool folder, as described in Section 7.4.1 on page 283, then make sure that it is enabled and that the inputs are started.

The preparation of the supplying RIP installation is simpler. Create page setups that use the output device plugin with resolution and other settings that match those you have chosen in the receiving installation. You do not need to select the `PGB hot folder` page feature.

7.16.2 Printing procedure

Depending on how you prepared the system, there are two possible methods. You can use both methods together.

- Supply page buffer files to a spool folder if you have set up one as part of the preparation described in Section 7.16.1 on page 329.
- Choose **Harlequin RIP > Print File**, navigate to the relevant folder, select the wanted files and click **Print**. (Page buffer files have the extension `.PGB` so be sure that you are displaying all files in the folder.)

Warning: For both methods, the receiving RIP effectively deletes the supplied page buffer file, at the same time as it creates a new page buffer in its own `PageBuffer` folder and makes it visible in the Output Controller / Monitor. Even if you use a spool folder input and leave **Delete on completion** unselected, the completed files copied into the Complete Folder are no longer valid page buffers.

When printing a page buffer file, the RIP displays a message in the RIP Monitor, similar to this example, where text in *italic* varies according to the file and plugin:

```
Introducing new pagebuffer: %C%/my_folder/00000003.PGB
    Pagebuffer created for device: my_device
    Page name: 2. fontlist (K)
Total time: 1 seconds
Job Completed: 00000003.PGB
```

The receiving installation of the RIP does not check whether each page buffer was created for an output plugin that the receiving installation has installed.

Any page buffers created by a plugin that is not installed either fail to appear in the Output Controller / Monitor, or trigger the error:

could not access a resource for a plugin device driver

7.17 Entering PostScript-language code by hand

If you would like to type code directly into the RIP and see the results interpreted, you can use the *Executive*, which allows you to type PostScript-language code, and have it interpreted immediately by the RIP.

If the input system is running, you must stop it using the **Harlequin RIP > Start Inputs** menu option. When you choose **Harlequin RIP > Executive**, the RIP asks you to select a page setup for use with the Executive.

Note: If you do not choose a page setup, the RIP uses the one that you chose last time you used the Executive. If you have not used the Executive in this RIP session, the first page setup in the pop-up menu is used. To change the order of this listing, see “Reordering page setups” on page 117.

The RIP then displays a window where you can enter PostScript-language code by typing or cutting and pasting. Any PostScript-language code that generates output when executed produces page buffers exactly like other jobs processed using the same page setup. It is wise to hold these page buffers for inspection in the Output Controller, where you can view or manipulate the page buffers, before sending any suitable pages for output. The Output Controller is available in either of the multiple page buffer modes.

Note: If you intend to keep page buffers produced from the Executive for any significant time, set a job name that helps you identify the page buffers.

To generate an interrupt, choose **Interrupt** from the **Executive** menu.

To quit the Executive window, type `quit` or Command-W at the prompt, or choose **Stop Executive** from the **Executive** menu.

Whenever you quit the Executive, the RIP Monitorwindow displays the following, harmless message:

Job Not Completed: *jobname*

Remember to restart inputs if you stopped them before using the Executive.

8

Media Management

This chapter describes how the RIP provides ways of monitoring and managing the use of media in a range of output devices. It also describes how you can configure these ways to suit your operation.

8.1 Why manage your media?

In a typical printing environment, you might have access to a number of different imagesetters, each of which takes one of several feed cassettes, or drum recorders, each of which holds a roll of continuous media. You may use several feed cassettes on one imagesetter, or share one between several imagesetters. You may even do both.

Figure 8.1 on page 334 shows a possible printing environment. This environment can produce several operational needs.

Suppose that you want to produce output from the RIP on a particular output device, using one of the cassettes available to you. Which cassette should you use? You do not want to use one that is low on media, in case it runs out before the job is printed.

At the same time, you want to make the most economical use of media. If a cassette contains just the right amount of the correct media for a job, it makes sense to use it instead of another one, so that media is not wasted.

The output (take-up) cassette is also worth monitoring. You may want to process all of a job together and need to know how much more media the output cassette can accept. Equally, if the output goes to an online processor, you may need to know that there is enough film output for the processor to handle satisfactorily.

In addition, there may be times when you want to cut the media in a particular cassette, or feed extra media. If you are working at your computer, and the output device is not located nearby, doing this by hand might be inconvenient.

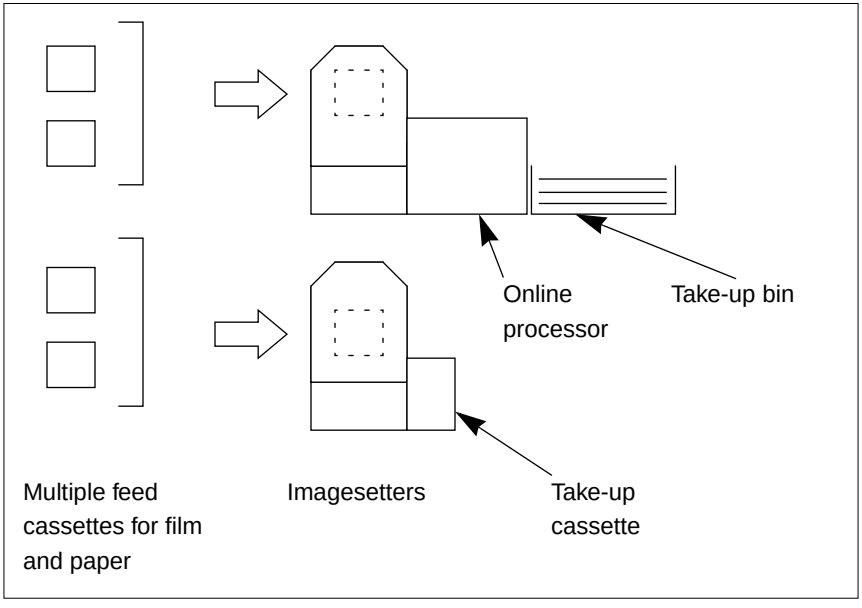


Figure 8.1 Using multiple output devices and cassettes

8.1.1 Overview of the Harlequin RIP capabilities

The Harlequin RIP media management can meet all these needs, subject to operating with suitable output devices and getting a minimal amount of information from the operator. These requirements are explained in later parts of this section.

The RIP can manage up to sixteen feed cassettes at once, using as many suitable output devices as are connected.

For each cassette (or roll-fed device) it can: monitor the media remaining, display the amount of media for the particular cassette in use, and issue automatic warnings when this amount is low.

The RIP can also instruct the output device to perform cut and feed operations, both automatically (at pre-specified intervals and events) and interactively, on request (when you choose menu options). The physical device itself must support software control of these functions.

You can still perform manual operations while using the RIP media management. The purpose of media management is to reduce the need for routine manual operation and record keeping.

A media saving feature is also available. For more information see Section 4.14 on page 162.

8.1.2 Suitable devices

You will gain some benefit from using media management with most types of output device. Media management performs most efficiently when the following assumptions are satisfied:

- The physical output devices are roll fed from cassettes. The RIP media management is not suited to, or necessary for, sheet-fed devices.
- When you change a feed cassette, you also mount an empty output cassette—by changing or emptying the full one.
- There is only one feed cassette mounted at a time. This is the usual case.

  There is at least one imagesetter which can have several input cassettes mounted at one time.
- Each physical device is represented by one Harlequin RIP output device. This is the usual case.

  The possibility of having multiple output devices arises because there are some physical devices which can provide multiple types of output. One example provides a dual technology (dye sublimation and thermal transfer) engine in one unit. These technologies have different characteristics and require separate strategies regarding calibration and color separation—providing each technology with its own output device type is a likely solution.

8.1.3 What you need to do

Media management reduces and simplifies your routine work but you need to perform a small amount of setting up for each cassette or media source before starting to use media management. This setting up includes:

- Specifying when automatic cuts or feeds and warnings should occur.

  You do this in the Media Manager dialog box.

- Naming cassettes and specifying their initial contents.

  You do this in the Cassette Manager dialog box.

After this setting up, all you have to do is tell the RIP when you change something that affects its records of media use:

- Which cassette is in use.

  You do this in the Edit Page Setup dialog box, using the **Cassette** menu.

- How much media you have put in a cassette when you refill it, and when you perform a manual operation that affects the amount of media.

  You do this in the Cassette Manager dialog box.

Note: Any management system that monitors the amount of media remaining relies upon knowing the amount that was available when the system was set up, since there is usually no automatic means of detecting this. It is therefore essential that you inform the RIP how much media is available to each cassette whenever it changes (for instance, when you refill one).

You must also ensure that the cassette being used to process a job is the same one the RIP thinks is being used. You can check this by seeing which cassette is chosen in the selected page setup.

8.2 Advancing and cutting media interactively

You can use the interactive options described in this section immediately, without performing any preparation.

This can be useful when you are starting to use a new system. Once you have established the effects of the options and decided which of these you want to use regularly, you can set up automatic procedures to reduce your need for

the interactive options: see “Advancing and cutting media automatically” on page 338. The interactive options (and any manual controls on the output device) remain useful for unusual jobs or special tests.

8.2.1 Device menu

Each interactive option is a Harlequin RIP menu command which affects the selected device and the cassette mounted in that device.

The commands are in a menu, which appears between the **Edit** menu and the **Color** menu. The menu changes its name to indicate the currently selected output device.

Note: For simplicity, this manual refers to this menu as the **Device** menu. The commands available in this menu can vary to suit the currently selected output device.

The first option in the **Device** menu is **Select Device**. Choose this option to see the Select Output Device dialog box, where you can see a list of available output devices. Select a device and click **Select**.

The possible names in the Select Output Device dialog box—and thus of the **Device** menu—are exactly the same as the ones you can choose from the **Output device** list in the Edit Page Setup dialog box. For example, the name might be UltreP or ExxtraSetter if the RIP is driving only one imagesetter, or only one of each type of imagesetter. If you are driving two imagesetters of the same type, there might be names such as Ultre_1 and Ultre_2: you can choose a name for each device when you set it up in the Device Manager.

8.2.2 Using the Device menu

For most output devices, the **Device** menu contains commands to advance (feed) the media and to cut it.

On some output device types, there may be extra commands or some of the default commands may be grayed out. (Any output device that you choose from the Device Manager can have its own version of the **Device** menu: in technical terms, the menu is specified in the relevant output plugin at the time of software manufacture.)

For example, if a device takes a long time to load film, there could be a pre-load command allowing you to load film during the processing of a page to avoid delay once the page is ready to image.

- To advance the media in the current device, choose one of the **Advance** menu options, when available.

  There are usually three options to advance the media, allowing you to feed 1, 3, or 6 inches of media through the imagesetter. (The relevant output plugin can be written to offer any number of similar options, specifying other lengths or units.)

- To cut the media in the current device, choose one of the **Cut** menu options. There are commands to cut with or without feeding media.

  If you choose **Cut media with feed**, or type Command-K, the RIP will feed a predetermined length of media through the imagesetter, and then cut. You can specify the amount of media to feed through, in the Media Manager. See "Automatic use" on page 339, for details of how to set this length.

  If you choose **Cut media no feed**, or type Command-L, the RIP will cut the film without feeding any extra media.

  Note: Some output devices, for instance the PelBox, always perform a feed before a cut. The RIP cannot override this feed, but it can keep a record of how much media is fed. If you use such a device, read its manual to find out this feed length, and enter the value in the box labeled **Built in cut length** in the Media Manager dialog box. See "Hardware feeds" on page 350.

8.3 Advancing and cutting media automatically

The automatic options described in this section reduce the number of times you need to use the RIP menu commands or front panel buttons on the physical output device. You must do some setting up to make sure that the automatic options do what you want.

The manual options remain useful for use with unusual jobs or special tests: see "Advancing and cutting media interactively" on page 336.

8.3.1 Automatic use

The RIP can advance the media in a cassette or drum recorder automatically. With many imagesetters, the RIP can also cut media, although this depends on the particular device you are using.

Figure 8.1 shows two possible schemes for advancing and cutting media automatically. The RIP supports these schemes and many others.

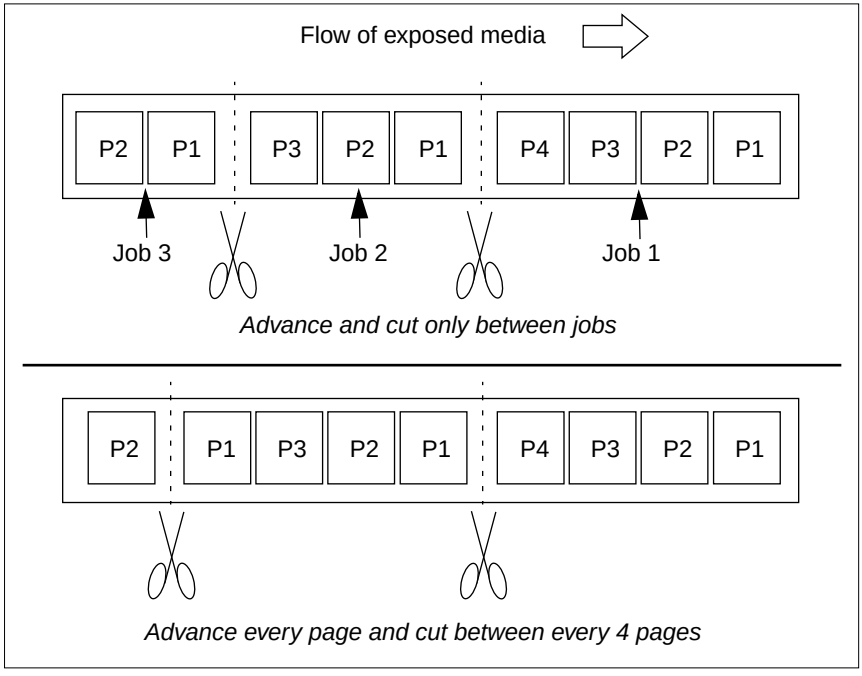


Figure 8.2 Some options for handling output media automatically

Using the Media Manager, you can make the RIP perform media cuts and feeds automatically, choosing when and how much media to feed through and when to cut.

You can also disable or re-enable all media management facilities as often as you wish. (Harlequin RIP output plugins designed for sheet-fed devices disable media management on those devices automatically.) You will probably want to disable media management when you share feed cassettes between different devices—this will prevent the RIP issuing meaningless warnings about low media levels.

Display the Media Manager dialog box by choosing **Media Manager** from the **Output** menu.

Figure 8.3 shows the RIP Media Manager dialog box. This dialog box allows you to configure and control media.

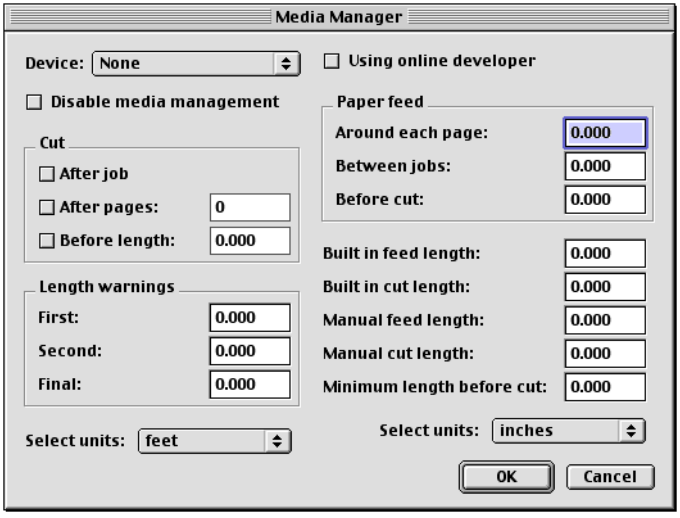


Figure 8.3 Media Manager dialog box

The RIP displays the name of the current device at the top of the dialog box, in the **Device** pop-up menu. All selections that you make in this dialog box apply to the displayed device (and to all cassettes that you use on this device). These selections are not confirmed until you click **OK**.

You can select another device using the **Device** list, then set up different options for managing media in the new device.

Click **OK** to confirm your media management choices for the device(s) that you have edited. Click **Cancel** to abandon all changes made to media management (on any device) in the current use of the Media Manager.

8.3.2 Enabling and disabling media management

In the Media Manager dialog box, there is a check box labeled **Disable media management**.

- Select this box to turn off the automatic media management facilities for the output device. If you turn off media management, there will be no current cassette selected in the Cassette Manager (See "Setting up the monitoring system" on page 344).
- Leave the box clear to enable media management.

Note: After enabling or re-enabling media management, you must verify the contents of each cassette used on that output device. For details, see "Setting up the monitoring system" on page 344.

8.3.3 Cutting media

With media management enabled, you can choose when the RIP will make automatic cuts.

Note: Any cut operation disables output, unless the output device is using an online processor (developer). Typically, you will need to fit a new take-up cassette before re-enabling the RIP outputs: the RIP displays a message to remind you of this.

You can choose from three different policies, available on the left of the Media Manager, in the section labeled **Cut**. The three choices are:

- Cut the media after each job.
- Cut the media after a certain number of pages.
- Cut the media when (or slightly before) a certain length of it has been exposed.

To use any of these options, select the check box labeled appropriately and, if there is a text box alongside the label, type a suitable value in that box.

If you choose a combination of conditions for a cut, the RIP will cut whenever any one of those conditions becomes true, and will then reset all counts of length or pages.

To cut the media:

After every job printed
: select the check box labeled **after job**. The RIP will automatically cut the media after every job output on the current device.

After a number of pages
: select the check box labeled **after pages** and enter the number—which must be a whole number—in the adjacent text box. The RIP will automatically cut the media after that number of pages has been printed.

At a certain length
: select the **before length** check box and specify a length in the box. This length is the maximum that will be exposed. For example, you might choose a length that is convenient to process.

  You can select the units you wish to use for length from the **Select units** pop-up menu in the bottom left of the Media Manager. The options available are feet, inches, meters, and centimeters.

Note: The RIP never cuts the media while part of the way through printing a page. Where a cut at the exact length would fall within a page, the RIP performs the cut before outputting the page. This occurs even if, for example, you specify a length of 12 inches and a page is 18 inches long.

8.3.4 Feeding media

The options on the right of the Media Manager let you specify when the RIP will feed media automatically. There are three feed policies under **Paper feed**:

- Feed the media around each page.
- Feed the media between jobs.
- Feed the media before every cut.

See below for a fuller description of these policies and some of the possible reasons for wanting extra media feeds in each of the specified situations. (The remaining entries in this section of the dialog box describe characteristics of the output device.)

To use any of these options, type the feed length that you want in the text box alongside the appropriate label. Type 0 (zero) into the text box if you do not want an automatic feed.

You can choose which units to use for the lengths from the **Select units** pop-up menu above the **OK** button—the available units are feet, inches, meters, centimeters, picas, and points.

Some reasons, and the details, for each feed policy are as follows:

Around each page
: Feed through some media around every page that is produced, perhaps so that you can perform cuts by hand more easily. Half of this amount will be fed before the page and half after it.

Between jobs
: Feed through some media after every job that has been processed, perhaps to make it easier to see where one job ends and the next starts.

  Note: This feed after a job will not occur if there is a cut after the last page of the job, caused by either of the **cut after pages** or **cut after job** settings.

Before cut
: Feed through some media before making any cut, perhaps to stop film near a cut being exposed to external light.

  The RIP feeds the amount of media you specify here before performing any of the automatic cuts described on page 341, or a cut that you have requested by choosing **Cut media with feed** from the **Device** menu. See also “Hardware feeds” on page 350.

8.3.5 Interaction with other Harlequin RIP options

The description just given of automatic cutting and feeding is accurate but there is also a degree of interaction with the RIP options to use media as economically as possible. These options either reorient pages or pack them together so that, for example, more than one page is imaged side by side in the length of media that would otherwise be used by one page.

The results are that the page length can vary or that the RIP treats several pages as one unit (and that this unit is treated as a page by the media management software). This may be unexpected but it should not cause any problems.

The relevant options occur in the **Optimization** and **Enable Feature** pop-up menus of the Edit Page Setup dialog box. See "Media saving option" on page 162 and "Features" on page 191 for a fuller description of these options.

8.4 Monitoring media

When you start monitoring media, you must tell the RIP how much media is in each cassette. Thereafter, the RIP maintains a record of how much media remains, and will warn you when any cassette is running low.

8.4.1 Setting up the monitoring system

The RIP monitors the feed cassette providing the media, rather than the output device used. This is because any one output device may take several different feed cassettes. For instance, you may have an imagesetter that can produce output on either film or paper, and you may keep two cassettes—one loaded with film and one loaded with paper.

Note: If you have an output device that uses a roll feed, you can monitor its use of media by treating it as a device with a permanently mounted cassette.

Before processing any jobs, you need to tell the RIP about the cassettes you are using and give details of the media currently in each cassette. You do this from the Cassette Manager dialog box. Click the **Cassette Manager** button in the Edit Page Setup dialog box or choose **Output > Cassette Manager** to open the Cassette Manager dialog box, as shown in Figure 8.4.

8.4.2 Cassette Manager and Edit Cassette dialog box

The main window of the Cassette Manager lists each available cassette, so that you can see and compare the information relating to different cassettes.

A new installation of the Harlequin RIP lists one cassette in the Cassette Manager. You can add more cassettes at any time, and subsequently edit their information or delete their entries using the **Edit**, **New**, **Copy**, and **Delete** buttons.

There is a related Edit Cassette dialog box in which you can alter the information for a particular cassette.

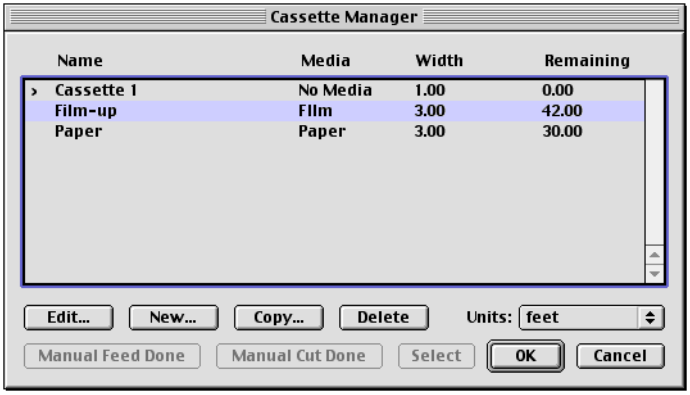


Figure 8.4 Cassette Manager dialog box

The information in the Cassette Manager also appears in the Edit Cassette dialog box: each category is listed below.

There are two buttons which appear in the Cassette Manager only. Use these buttons to tell the RIP when you have performed a manual operation. (On some output devices, a manual operation may be the only option or it may be quicker than an operation driven by the RIP.)

Manual Cut Done

Click this button when you have cut the media in the current device.

Manual Feed Done

Click this button when you have performed a manual feed of media in the current device.

Before using one of these buttons, you must set up the amount of media used in the corresponding manual operation. These quantities are labeled **Manual feed length** and **Manual cut length** in the Media Manager. See "Hardware feeds" on page 350.

To set up or change the details for a cassette, select the relevant cassette in the Cassette Manager window and click the **Edit** button. Figure 8.5 shows the Edit Cassette dialog box that appears, containing the details for the selected cassette.

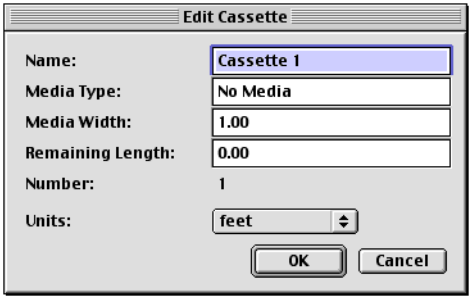


Figure 8.5 Edit Cassette dialog box

The RIP displays the following values in both the Edit Cassette dialog box and the Cassette Manager. You can only change these values from within the Edit Cassette dialog box.

The RIP displays the information about a cassette in columns in the Cassette Manager and in corresponding text boxes in the Edit Cassette dialog box.

Cassette name An identifying name. This name will be displayed on the **Cassette** pop-up menu in the Edit Page Setup dialog box. The name is purely for your own convenience—you can change it to any name you like. Choose a name that allows you to identify the cassette and that suits your situation and your procedures. You might find it helpful to attach a label with this name (and the type of media) to the actual cassette.

For example, if you use two cassettes only on an Ultre imagesetter and only for specific types of media then you might name these cassettes: *UltreFilm1* and *UltrePaper2*. An alternative solution in the same situation might be *Ultre1* and *Ultre2*, with a separate record of the type of media. If you use the same cassette to hold paper and use it for proofs on different output devices then you might call it *PaperProof*.

Note: The symbol **>** in front of the cassette name indicates the cassette in use on the current or most recently used output device.

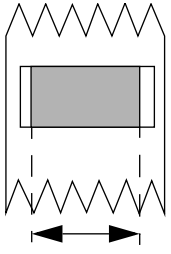
Media type

The type of media held in the selected cassette. It lets you tell quickly whether, for instance, the cassette holds paper or film. The field **Cassette Name** is purely for your own convenience—you can change it to anything you like.

The entry `No Media` means that no one has yet specified a type of media for the cassette.

Media width

The width of the media in the selected cassette or drum recorder. The RIP uses this value when calculating in which orientation to print a page if you are using the `Media Saving` option in the **Optimization** menu. (See "Printing effects" on page 175.)



You must set this value to the actual width of media that can be printed on (the imageable width) because some output devices cannot image right up to the edge of the media. If you enter the total width of the media and the output device has a smaller imageable width then some large pages are likely to extend into the non-imageable area and those output pages will be clipped or visually corrupted when the RIP attempts to output them. The illustration to the left shows an example of

clipping where a page (the rectangle) is wider than the imageable width (arrowed): only the area shown shaded is imaged successfully.

Remaining length

The amount of media left inside the cassette. The RIP updates this value whenever it advances or prints media. (The RIP also tests the updated value against your choice of threshold values so that it can warn you when the media is running low.)

You must type in the length that you have loaded whenever you refill a cassette with media.

Number A unique number that the RIP uses to keep track of the cassette. You can edit this number only when creating an entry for a new cassette—the RIP suggests an unused number, but you can use any other unused number.

Units The units used in the measurement fields in this dialog box. Use this pop-up menu to choose any convenient unit. The RIP converts any figures already displayed to the units you choose.)

Note: The unit of measurement that you choose here is also used to display media usage in the Media Monitor window: see “Monitoring media” on page 344).

8.4.2.1 Closing the dialog boxes

You must close the Cassette Manager before you can use any tool bar buttons or menu options in the Harlequin RIP.

Click **OK** to confirm all the changes you have made in this use of the Edit Cassette dialog box. This confirmation is provisional: you must also click **OK** in the Cassette Manager to finally save your changes. The **OK** button saves the changes you have made and closes the Cassette Manager. If you opened the Cassette Manager from the Edit Page Setup dialog box, you can also save the changes by clicking the **Select** button. In addition to saving the changes, the

Select button displays the selected cassette in the Edit Page Setup dialog box. Click **Cancel** to discard all changes.

Note: If you open the Cassette Manager from the Edit Page Setup dialog box, changes that you make in the Cassette Manager are independent of the Edit Page Setup dialog box. For example, if you create a cassette, and close the Edit Cassette and Cassette Manager dialog boxes with **OK** or **Select**, the new style will remain even if you cancel the Edit Page Setup dialog box.

8.4.3 Using media management

When using media management, you must select both the feed cassette to be used and the output device, in the Edit Page Setup dialog box (as described in "Cassette management" on page 194). When printing a job, the RIP uses the cassette selected in the saved page setup associated with the input source providing the job.

When you perform a manual operation on the output device, use the **Manual Cut Done** or **Manual Feed Done** buttons in the Cassette Manager dialog box.

When you refill a cassette, you must use the Edit Cassette dialog box to inform the RIP how much media is now in the cassette.

8.4.4 Using media management with multiple setups

Sometimes you will need to process a job on a device that had previously used one cassette and now must use another. This is quite likely to happen when using a number of different page setups.

When a change of cassette is required, the RIP will warn you that the correct cassette is not in the current device, and will halt printing until you have loaded it. This ensures that you will never waste time or media by printing jobs on the wrong cassette.

If you are running the RIP in a Multiple mode, the warning will appear in the progress box of the Output Controller. If you are running in a Single mode, it will appear in a separate progress box on the screen.

Note: The RIP cannot tell which cassette is loaded on the output device, so it will issue a warning even if you have changed to the correct cassette after the previous job was produced.

Always inform the RIP when you physically change cassettes, by selecting a page setup that uses the new cassette.

8.4.5 Low media warnings

The RIP can warn you when the amount of media in the current feed cassette is low and before the media actually runs out. You can specify thresholds for up to three warnings using the Media Manager.

In the section labeled **Length warnings**, type values into the **First**, **Second**, and **Final** text boxes. The RIP sorts the three values so that the length for the first warning is greater than for the second, which itself is made greater than the final threshold. All three warnings appear in the Output Controller: they are *Media low*, *Media very low*, and *MEDIA VERY LOW*.

Choose the units used for these lengths from the **Select units** pop-up menu immediately below the **Length warnings** text boxes—the options available are feet, inches, meters, or centimeters.

Note: Once you have refilled a cassette, you must update its details in the Cassette Manager if you want media management to continue to work correctly.

8.4.6 Hardware feeds

Some imagesetters automatically feed the media a certain amount before printing any page or before performing a cut; and they also may have front panel buttons that trigger these or similar actions. The RIP cannot override these hardware feeds but it can record them and calculate their effects on the amount of media left in any input cassette.

If you have an imagesetter that issues hardware feeds, and you use media management, you must tell the RIP how much media is fed through when a hardware feed is performed, so that it can take this into account.

This involves two stages: set up and routine use.

Perform the set up by selecting the output device in the **Device** pop-up menu in the Media Manager. The relevant options are on the right of the Media Manager:

Built in feed length

Type into this text box the amount of media that the output device feeds when it receives a software feed request.

The Media Manager will add this amount to its record of the amount of media consumed for every job processed, and deduct it from the details of the relevant cassette. This is used in addition to the **around each page** feed value.

Built in cut length

Type into this text box the amount of media that the output device feeds before a cut triggered by software.

Whenever a cut is issued, the RIP will subtract this amount from its record of the remaining length of media for the current cassette. This is used in addition to the **before cut** feed value.

Manual feed length

Type into this text box the amount of media that the output device feeds when a front panel button triggers a media feed.

The RIP adds this amount to its record of the amount of media consumed, and deducts it from the details of the relevant feed cassette.

Manual cut length

Type into this text box the amount of media that the current output device feeds before a cut triggered by a front panel button.

Whenever you inform the RIP that you have performed a cut, the RIP subtracts this amount from its record of the remaining length of media in the current cassette.

For these options, you can choose units from the **Select units** pop-up menu at the bottom of the dialog box. The units available are feet, inches, meters, centimeters, picas, or points.

Note: The feed lengths for built-in and manual operation *may* be the same. If they are the same, enter the same value in the two fields.

In routine use, there are two cases:

- The RIP takes account of the values you set up when calculating the effects of any automatic operations and ones that you request from the **Device** menu. You do not need to do anything extra.
- If you perform a manual operation by using controls on the output device, you must inform the RIP. Display the Cassette Manager and click the button **Manual Cut Done** or **Manual Feed Done** whenever you perform the corresponding manual operation. See Figure 8.4, page 345, and the following description of the buttons.

8.4.7 Online developers or processors

If you are using an online developer with a particular output device, you must inform the RIP so that it can handle that device correctly.

There is an obvious benefit to using an online developer because media that emerges from the output device is fed directly to the developer, which produces the image automatically. However, online developers need to be fed a certain amount of media before they can develop any images—for example, a particular online developer may require a minimum of two feet of media. If the RIP or an operator performs a cut before the required amount of media has been exposed, then any images on the exposed media will not be developed automatically, and there may be a media jam in the developer. It is easy to avoid this problem.

To set up the RIP to drive an output device with an online developer, first make that device current and display the Media Manager. Make these two settings:

Using online developer

Select this box to show that you are using an online developer.

Minimum length before cut

Enter in this text box the minimum length of media that the online developer requires for processing.

You can choose the units for this length from the **Select units** pop-up menu immediately below. The units available are feet, inches, meters, centimeters, picas, and points.

In routine use, you do not need to do anything extra. The RIP will make an automatic cut only if there is sufficient exposed media to enable the online developer to work effectively. If you need to force a cut, select **Cut with feed** from the **Device** menu. This command feeds enough media to pad the output to the **Minimum length before cut** value, and then performs a cut.

When using an online developer, the RIP does not issue warnings to change take-up cassettes, and does not disable output after a cut.

8.4.8 Monitoring your media

When you are using media management, the RIP can display information about media usage on your computer screen and keep the information up to date as jobs are output.

Choose **Media Monitor** from the **Output** menu to display the information.

The information appears in the Media Monitor, shown in Figure 8.6. By default, when in Multiple (Parallel) mode, the RIP displays both the Output Controller and the Media Monitor.

Figure 8.6 Media Monitor window

The media information is presented in the following fields:

Name — The name of the feed cassette.

A series of asterisks (***) in this field shows that the current output device has media management disabled.

Type — The type of media in the feed cassette.

A series of asterisks (***) in this field has the same meaning as in the **Name** field. The entry `No Film`, `No Media`, or a blank entry, means that no one has defined the type of media, not that the cassette is empty.

Pages — The number of pages exposed since the last cut was performed.

Length — The amount of media left in the current feed cassette.

This length is shown in the unit of measurement that you can choose in the **Units** field in this dialog box.

Exposed — The amount of media that has been exposed since a cut was last performed. This is also the amount in the take-up cassette.

Units — The units of measurement for figures in the **Length** and **Exposed** fields. Choose any convenient unit from those listed.

9

Fonts

Whenever the RIP processes a job that uses fonts, they must be available in memory. Fonts are loaded into the RIP from the disk automatically whenever they are required. However, the fonts must have been installed first, or they must be embedded in the job that uses them. Installation is a once-only process where the RIP configures the font for its use and puts it in the appropriate place. This chapter discusses how fonts are installed and then used by the Harlequin RIP.

The RIP provides a suite of facilities that let you manage fonts easily and efficiently. This suite includes commands that will:

- Install fonts in the RIP.
- Tell you which fonts are currently installed.
- Produce a proof of any font currently installed.
- Remove fonts from the RIP.

9.1 Supplied fonts

The Harlequin RIP comes with the 35 standard fonts found in most versions of the Apple LaserWriter and many other PostScript printers. The RIP font folder also includes several special-purpose fonts:

- The Harlequin font is used only for the Harlequin RIP logo.
- The HP-Times-Roman and HP-Courier fonts are used for PCL emulation. PCL is the Printer Control Language used in Hewlett-Packard laser printers.
- The NotDefFont font is used by composite fonts.
- The Stick font is used for HPGL emulation. HPGL is a plotter language used by some Hewlett-Packard laser printers. The Harlequin RIP supports HPGL2 with this font.

The RIP supplies the 35 standard fonts and the special-purpose fonts installed in the `fonts` folder in the `SW` folder.

9.2 Types of font

There are several different types of fonts that can be installed and used with the RIP. See Section 9.4 on page 359 for details about installing fonts.

- Type 1 fonts—these are the most commonly used fonts. Type 1 fonts can contain *hints* that can subtly change the shape of the characters. Hinted fonts can improve the appearance of text rendered at low resolution or at small sizes on higher resolution devices: for example, hints can affect 11 point text at resolutions up to 2000 dpi.

  Note: The font downloaders supplied with many Type 1 fonts actually install Type 1 fonts as Type 4 fonts.

- Type 3 fonts.
- Type 0 (composite) fonts—these are special fonts designed to support large character sets such as Japanese or Chinese. Type 0 fonts can use any base font format (Types 1, 3, 4, 32, 42) and CID fonts. Type 0 fonts can support multi-byte character encodings. Older Type 0 fonts had multiple sub-fonts and as such used a lot of memory however, the new CID-keying method is much more memory efficient.

- Character identifier (CID) composite fonts, together with associated character map (CMap) files are used to produce CID-keyed fonts, which exist only in the memory of the Harlequin RIP (or other RIPs).

  There is not easy method of determining whether a TrueType font should be installed as a CID font or not. If installed as a CID font, the order of characters in the font is not easily predicted. Improvements to this are expected in future releases.

- Single-byte PC format TrueType fonts or OpenType fonts with TrueType outlines.

- The RIP also supports installation of native TrueType, Type 42, raw CFF (Compact Format) and OpenType / CFF fonts. Multiple-font CFF or OpenType / CFF fonts will be installed as FontSet resources, but these will not appear in the **Proof** or **Delete Fonts** menus, or in the font **List**.

Note: The font resources created when installing CID fonts are CID-keyed fonts and are created automatically by the RIP. These font resources are created when CID fonts or CMaps are installed using the **Install Fonts** option in the Fonts menu, and are deleted when CID fonts are removed using the **Delete Fonts** option from Fonts menu. Font resources may also be created or deleted on startup, if the available CID fonts or CMaps have changed since the last bootup.

Installing a CID font over AppleTalk with a font installer will not automatically create font resources; the RIP must be quit and restarted to do this.

The created font resources may be deleted using the **Delete Fonts** option on the Fonts menu, and will not be re-created by the RIP.

Note: The RIP supports the use of a variety of other fonts, for example, when they are embedded in PostScript-language or PDF jobs. The embedded fonts can include Compact Font Format, Type 42, and Type 32 fonts.

Note: The font data cache is not configurable, but takes 0.5 MB for all fonts. So, for CID, native TrueType, CFF, and OpenType / CFF fonts, 1 MB extra RAM should be sufficient.

9.2.1 Font resource directories

The Font resource directories can be changed. The default locations are:

- Font resources are installed in `SW/fonts`.
- FontSet resources are installed in `SW/FontSet`.
- CID fonts are installed in `SW/CIDFont`.
- CMap files, which are placed in the `SW/CMap` folder.

Throughout this section these are the directories referred to when font resources are mentioned.

9.3 The DLD1 format

The Harlequin RIP will convert Type 1 fonts (and Type 1 fonts contained within composite fonts) into its own DLD1 font format.

The DLD1 format stores font data far more efficiently than do standard storage formats. Access to font data, and operations upon fonts, are made much faster, while the amount of PostScript-language virtual memory consumed by the font is reduced dramatically.

The benefits of using the DLD1 format include: a DLD1 format font occupies less disk space; and this format can require under 10% of the memory space of other formats. This table shows some typical figures for the disk and memory requirements of a font in DLD1 format, and for the corresponding font in Type 1 and Type 4 formats.

Table 9.1 Disk and memory requirements for font types

Font type	Disk space (KB)	Memory (KB)
DLD1	45	4
Type 1	100	50
Type 4	50	30

Note: It is difficult to give corresponding estimates for Type 3 fonts because they are inherently so flexible, but they are not particularly efficient.

9.4 Installing fonts in the Harlequin RIP

If a job requires a particular font, the font must already be installed in the RIP before the job is processed, unless the job itself contains the font definition. If the font is not found, the RIP will instead print the text in a selected substitute base font (see “Font substitution” on page 367), or issue an error message, depending on the setting for **Abort the job if any fonts are missing** in the Page Setup Options dialog box. See Section 4.23.8 on page 198 for details.

Depending on the font type, you can install a font into the RIP in one of two ways: by using the **Install Fonts** command or by downloading the font to the RIP.

All fonts may be embedded, and all fonts may appear in the `fonts` and `CIDFont` resource directories. Most font formats can be installed using the **Install Fonts** command, including, Types 1, 3, TrueType, Type 42, CID Types 0, 1, 2, 4 (same as Type 32), CFF, OpenType and CMap resources.

The **Install Fonts** command and downloading fonts to the RIP are described in the next two sections.

See “Removing fonts” on page 365 for details about deleting the fonts you have installed.

9.4.1 Install Fonts command

When you choose **Install Fonts** from the **Fonts** menu, the RIP displays the Install Fonts dialog box shown in Figure 9.1.

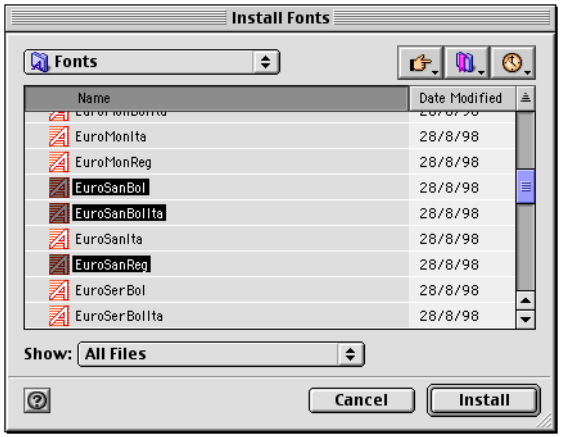


Figure 9.1 Install Fonts dialog box

A list of files in the current folder is displayed in this dialog box.

1. **Install**.

To install a collection of fonts, do the following:

1. Select a font in the list.
2. Select other fonts, moving to other folders if required.

When you have selected all the fonts you want, click **Install** to install them in the RIP.

A successfully installed font produces the message:

```
Installed font 'font_name' in TrueType format
```

Note: The format type will be reported in this way for single-font packages only (not FontSets). The type reported will be TrueType, Type 42, Type 1, DLD1, Type 2, Type 3 and so on.

The **Install Fonts** command will install into the RIP Type 1, Type 3 and single-byte PC format TrueType fonts or OpenType fonts with TT outlines.

OpenType / CFF is supported. Single-font [1]OTTO packages will install as a single font or CIDFont as appropriate. Multiple-font packages will install as FontSet resources.

If you try to install a file that does not contain a font, or that contains a font of another type, the RIP displays a message in the RIP Monitor. This will not harm the RIP or the file in any way—the RIP just refuses to install it.

Using the installer, TrueType fonts only install as non-CID fonts. They therefore have to be manually moved to the `CIDFont` resources directory to make them appear as CID fonts.

If a font is of Type 1, it will be converted into DLD1 format before being added. This can then be loaded into the RIP whenever necessary.

Installation is performed on a copy of the font, so your original font file remains intact.

9.4.2 Downloading fonts to the RIP

This section describes how to download fonts to the RIP.

- Multiple Master fonts
  Multiple Master fonts may be downloaded over AppleTalk from a Macintosh using the downloader supplied with them.
- Composite fonts
  Composite fonts vary greatly, and so the procedure for installation is likely to be different for each one: there is no industry standard for this at present. Almost all composite fonts now come with their own AppleTalk installers; however, there is still a small number that are shipped as a collection of self-installing PostScript-language files. Contact your font supplier for more detailed information about using particular composite fonts with the RIP.
- TrueType fonts
  No downloader is needed for TrueType fonts. Using a downloader makes them less efficient if converted to Type 42 format. TrueType fonts should be installed using the **Install Fonts** command.

[1] OpenType fonts containing CFF data use the tag “OTTO”

- CID fonts
  If your CID font is supplied with a downloader, install the font and any relevant CMap file over AppleTalk using the supplied downloader. If no downloader is supplied, use the **Install Fonts** command. At present, however, CID fonts have to be manually moved to the `CIDFont` resources directory to make them appear as CID fonts.

All installed fonts are placed in the `fonts` resources directory, except for CID fonts and CMap files, which are placed in the `CIDFont` and `CMap` resources directories respectively.

Leaf fonts and composite fonts are sub fonts of Type 0 fonts and are installed elsewhere.

9.5 Pre-loading fonts

The Harlequin RIP always pre-loads the 35 standard fonts, since one or more are likely to be used by most jobs. If you frequently use a particular set of other fonts, you can ask the RIP to load them automatically upon start-up.

The RIP will take slightly longer to start-up, but once loaded, the fonts will be in memory when jobs require them. This saves time when processing jobs, since the RIP does not have to stop interpreting to wait for a font to be loaded. The time savings can be considerable—if a job requires a composite font, the RIP could be waiting for a few seconds to load it. By having it pre-loaded, you will save this time with every job that uses it.

Note: You can use this method to pre-load composite fonts, so long as they have been installed according to the instructions in “Downloading fonts to the RIP” on page 361.

To pre-load a font, add a new line to the Harlequin RIP initialization file, `Hqn`, and restart the RIP. This initialization file is in the `Sys` folder in the `SW` folder.

You must add one line of PostScript-language code for every font you want to load. For example, the following lines load ZapfChancery-MediumItalic and ZapfDingbats into the RIP:

```
/ZapfChancery-MediumItalic HQNloadfont
/ZapfDingbats HQNloadfont
```

The RIP may take slightly longer to start up, but any jobs using these fonts will run considerably faster. Pre-loading a composite font takes longer than pre-loading other types of font, but saves more time for each job using it.

9.6 Producing a list of installed fonts

Sometimes you will need to know whether a particular font is currently installed in the RIP. You can produce a list of all the currently installed fonts by choosing **Fonts > List Fonts**.

Note: The **List Fonts** option does not show FontSet resources.

This list will appear in two places:

- The RIP Monitorwindow—this lets you see immediately whether or not fonts are installed.
- The file `LOGFILE` in the `SW` folder—this provides a more permanent record of which fonts were installed at a particular time.

The date and time accompanies every list.

9.7 Proofing fonts

Sometimes you may want to produce a formatted listing of all the characters in a particular font—known as a *proof*. This would normally entail writing a special PostScript-language job to produce the listing, but the RIP allows you to produce a proof of any installed font automatically.

Note: The RIP can proof CID fonts only in long format. Also, the RIP will not use a substitute font in short format. If you do not choose long format, the RIP reports:

```
CID fonts cannot be proofed - try Proof fonts in long format.
```

Palatino-Italic

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQR
1234567890-=!@#$%^&()_*

Figure 9.2 An example of font proofing

You can proof fonts, either on a printer or on your screen, by choosing **Proof Fonts** from the **Fonts** menu. The RIP produces the proof using your choice of page setup and fits as many fonts as possible on a page. Figure 9.2 shows an example of a short-format proof for one font.

When you choose **Proof Fonts**, the RIP displays a dialog box that lists all of the fonts currently installed, as shown in Figure 9.3.

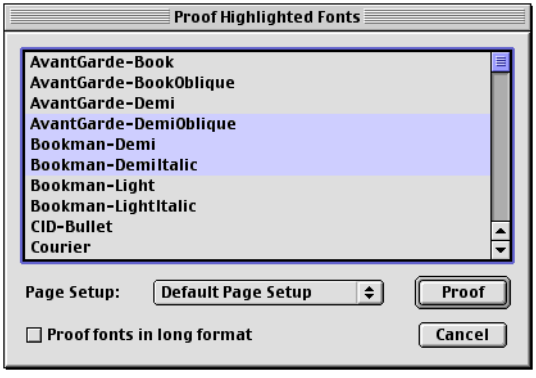


Figure 9.3 Proof Highlighted Fonts dialog box

First, choose an appropriate page setup for proofing the fonts, from the **Page Setup** pop-up menu.

Note: If you forget to choose a page setup, the RIP uses the one that you chose last time you proofed fonts. If you have not proofed fonts in this RIP session, the first page setup in the listing is used. To change the order of this listing, see “Reordering page setups” on page 117.

Select the fonts you want to proof, and click **Proof**. You can select as many fonts as you like.

To select all the fonts listed, type Command-A.

To select a block of several fonts, select the first font in the block, and then hold down the Shift key and select the last font in the block.

To select several unconnected fonts, hold down the Command key while clicking to make your selection.

The RIP constructs a PostScript-language job and then runs it, as if you had used **Print File** to print an existing file. If other jobs are pending, the proof takes its place in the queue.

By default, proofs only show a sample of the full character set in a font. If you want a proof of the complete set of characters, select the **Proof fonts in long format** check box.

Note: CID fonts can be proofed, but only in long format. FontSet resources cannot yet be proofed.

9.8 Removing fonts

You can remove most font types using the **Delete Fonts** command. The two exceptions to this are composite and CID fonts.

- Composite fonts
  We recommend that you remove a composite (Type 0) font using the font downloader supplied with it. This will ensure that the leaf fonts are removed. In many cases this is also the only way to recover a font license if the license restricts you to a fixed number of installs.

- CID fonts
  CID fonts which you have installed using the **Fonts** menu **Install Fonts** option should be deleted using the **Fonts** menu **Delete Fonts** option.

  Note: If there is a CID font and, for example, a Type 1 font with the same name, the name is listed twice. If you delete such a font, the RIP deletes the Type 1 font first; and then the CID font, if you choose to delete again.

When you choose the **Delete Fonts** command from the **Fonts** menu, the RIP displays a dialog box, as shown in Figure 9.4, where you can select the fonts to remove. As with the Install Fonts and Proof Fonts dialog boxes, you can select as many fonts as you want.

When you click **Delete**, the RIP removes the fonts you have selected immediately.

Warning: If you remove a font, and then need to process a job that uses it, you will first have to reinstall it. There is no confirmation dialog box. Before clicking **Delete** be sure that you have the original file from which you can reinstall the font.

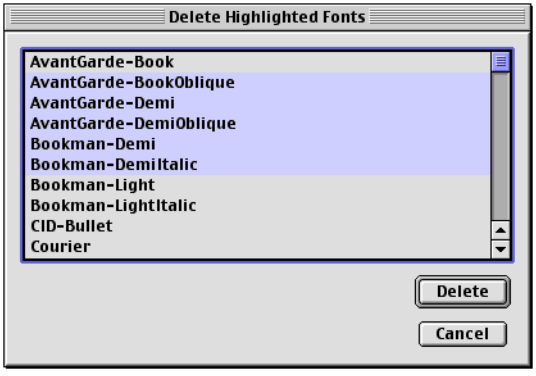


Figure 9.4 Delete Fonts dialog box

9.9 Composite fonts (Type 0)

The RIP provides full support for composite fonts. Because of their size, composite fonts are treated specially. You cannot install all of them using the **Install Fonts** option, for example, and there are certain considerations you must

make if they are to be used efficiently. See Section 9.4.2 on page 361 for information about installing composite fonts.

Composite fonts are usually very large, and can consume much computer time and memory. Whenever a character is encountered in a job, a RIP must find its definition in the composite font, and then convert it into a bitmap, before it is printed or previewed. If a RIP does this for every character in the job, it will be very slow.

The RIP minimizes the number of character conversions it has to do by storing the results of conversions in a RAM cache store. This means that the first time a character is seen, it is converted it into a bitmap and stored in the cache. When that character is seen next, the RIP does not need to convert it again because it can find the result immediately in the cache store. Significant savings in processing time can be made using this method, especially when dealing with frequently used characters.

The RIP is able to cache more character data when more memory is available to it. We recommend you allow extra memory in the range 16 MB through 32 MB. You will need more memory still if you wish to cache several composite fonts. Try experimenting with memory allocation, as requirements will depend on the fonts and types of job you have.

If you are going to use a composite font regularly, you should pre-load it into the RIP. See “Pre-loading fonts” on page 362. Pre-loading makes the RIP slower to start up, but saves a great deal of time when processing jobs that use those fonts.

9.10 Font substitution

Generally, it is preferable to use the exact font that was used in the design of the document. However, there are times when this is not possible; a font may be corrupt; or the original font may not have been sent with the original file. In such cases the only solution is to substitute with a font that is very similar in design to the original specified font. The customer may ask you to do this to get the job done on time.

If substitution were not available, the RIP would do one of two things: error and refuse to produce the job or substitute a default font, depending on the

setting of the **Abort job if any fonts are missing** option, see Section 4.23.8 on page 198. Either result may be unacceptable.

One solution is to open up all the pages in the original application program and search and replace every occurrence of the problem font. This is not ideal as it is time consuming; you may not have the original application and if you miss one or two occurrences where the font was used, the processing time would be wasted.

Having the RIP do the substitution for you "on the fly" is the best solution because all occurrences of a font are guaranteed to be substituted.

In the RIP, the file `SW/Config/FontSubstitution` is automatically run as the RIP boots. You can configure the following information in that file:

- Default font to use.
- Default CID font to use.
- Font substitution table.
- CID Font substitution table.

In all cases the `FontSubstitution` file has many comments and is intended to be self-documenting.

From the Eclipse Release SP1 a new font substitution mechanism has been added which is similar (and in addition), to the existing font substitution mechanism (defined by entries in the `SW/Config/FontSubstitution` file).

Whereas the existing substitution mechanism is unconditional, the new mechanism only attempts a substitution if the initially given font name cannot be found. However, if a conditional substitution is made, a message is displayed on the monitor indicating the substitution:

```
Warning:  font  <-name-> not found, using <-name-> instead
```

For example:

```
Warning: font Arial not found, using ArialMT instead.
```

You can silence this message by uncommenting the line in `SW/Config/Font-Substitution` which specifies the `/SilentCondFontSub` key.

For more information see the Conditional Font Substitution section in the `SW/Config/FontSubstitution` text file.

9.11 The HqnFontSetStubs start up files

The `Sys/ExtraStart/10HqnFontSetStubs` and `Sys/ExtraStart/20HqnCIDFontStubs` files are run by the RIP at startup and perform the following functions:

`Sys/ExtraStart/10HqnFontSetStubs`
: Generates stub fonts for FontSet resources. The stub fonts will be installed on the `%fontset%` pseudo-device.

`Sys/ExtraStart/20HqnCIDFontStub`
: Generates the CID-keyed resources for newly-installed, and previously undetected CID fonts and CMaps.

Either of these files may be removed if the functionality is not required. The numeric prefix to their names is to force a particular running order; FontSet stubs should be created before CID font stubs, because FontSet stub files may be CID fonts. The files in `Sys/ExtraStart` are run in alpha/numeric order.

9.12 Font Backup

The font backup utility allows you to easily transfer fonts from your existing RIP to a newly installed RIP.

To use font backup, select a default page setup and RIP the file:

`SW\Utilities\BackupFonts.ps`

This creates a file which effectively contains backups of font files, (and some other files) from the `SW` folder.

A message appears in the monitor window informing you of the name of the PostScript language file created.

When you have installed your new RIP, you should run this PostScript language file to install those font files on your new RIP.

10

Calibration

This chapter discusses *calibration* of output devices. Calibration involves the measurement of test images produced on an output device and the use of those measurements to produce stable images with good tonal values: here, *good* means consistent and usually linearized (in some measurement system). Some devices have a published specification that you can use in place of measured data: this is true of many printing presses. In demanding applications, you may use several different calibrations on the same device, according to the settings on the device or within the RIP.

The way calibration is applied has been changed for Harlequin RIP version 5.5r1. For more information see .

This chapter describes how you can produce suitable test images (called targets or test strips), measure their characteristics, then enter or edit calibration data, while Chapter 4, "Configuring Output Formats", describes how you can choose different calibrations when producing output.

10.1 Why calibration is needed

Regardless of the accuracy of an output device, the media and other consumable items can vary and have an effect on the output. For example, an imagesetter may produce an accurate and stable exposure of the media on which it is imaging but the reaction of that media varies from paper to film, and from

one media manufacturer to another. Also, laser dots are never square (as in an idealized raster), usually overlap, often cannot resolve a single pixel, and cannot always be turned off between adjacent pixels. Similarly, in direct output devices, overlap of toner dots in laser printers or ink spreading in inkjet devices often produces a deviation of some kind between required gray levels and those actually output.

Whatever the physical reason, the result is variability or non-linearity and some adjustment is almost always necessary to compensate for these physical artifacts. This is called calibration.

Note: In almost all output devices, a solid (100%) black area prints as a 100% black area, and white always prints as white. Any failure to achieve this degree of faithful reproduction usually indicates a problem or maladjustment in the output device, which you must cure before attempting calibration.

Consider the irregular solid line in Figure 10.1. It shows an example of the kind of response typically seen from red-sensitive paper on a Helium / Neon-based imagesetter. The diagonal dotted line represents the theoretical line that would be shown for a perfect material. The arrowed lines show how if you request a 50% tint you will actually see something like a 65% tint on paper, when measured with a densitometer.

When setting flat tint areas for monochrome print work, variation in gray level is often immaterial because the relatively small tonal variations encountered will not be visible to an untrained eye. But as soon as scanned images are introduced into monochrome work, it becomes apparent that highlight and shadow detail is lacking and, typically, that the image is darker than expected. The higher the halftone frequency used, the more the shadow areas will fill in and highlights will lighten—and the more necessary calibration becomes.

Color process work brings the problem into flat tint work as well, because variations of only a few percent from the requested value in just one of the color plates can throw the final apparent color well away from that intended.

Note: Calibration is important in color work, but it is not a complete answer. Calibration is sufficient only where the originally requested colors are prepared with the final output device in mind; calibration can adjust the individual color values but not the hues of those colors. A color management system

is required to make adjustments which change hues, as for example in digital proofing.

The RIP allows calibration sets to be built for particular configurations. By choosing appropriate calibration sets, you can make the RIP correct for variations caused by different output devices, line frequencies, exposure values, dot shapes, and negative / positive setting.

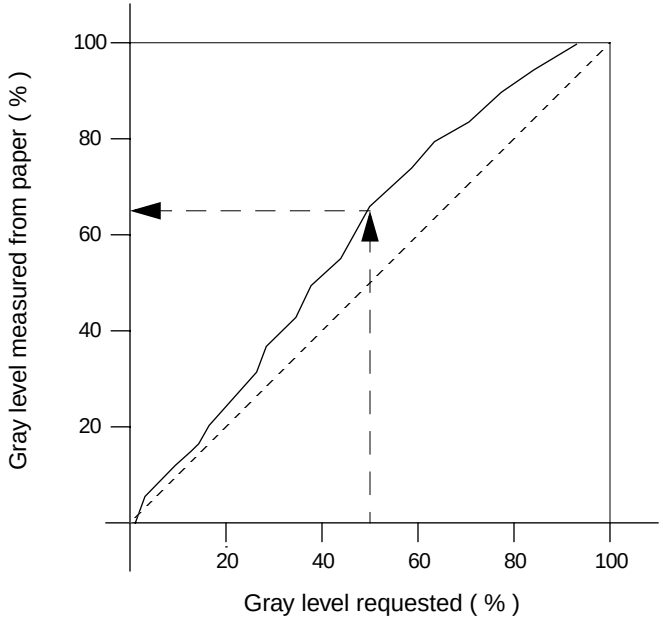


Figure 10.1 Response of red-sensitive paper on a Helium/Neon-based imagesetter

10.2 Calibration and linearization

Linearization is a special case of calibration, commonly used when producing output on an imagesetter.

Linearization is the process of adjusting values on output so that the result is proportional to the values requested, in some suitable measuring system. On film, this is usually a matter of ensuring that the gray levels produced are the ones you request in halftone dot area coverage. For example, if you ask for a 42% tint in your page make-up application then, after linearization, the output device produces that 42% tint correctly.

Note: Calibration can only provide the desired output to the accuracy with which you can measure gray levels, and with which the output device can produce them. See “Assessing attainable accuracy” on page 393 for details.

10.2.1 Non-linear devices

It is an established industry practice to accept non-linearity in the transfer from film to printing press. Frequently, whoever performs the scanning or layout design uses their judgement to introduce a compensatory adjustment in the scanner settings or choice of tints, basing the compensation on the kind of printing press to be used.

Calibration is still a valuable process in this scheme but the purpose is to produce a known and repeatable non-linear transfer.

It is possible to create a single calibration set that compensates for the combined characteristics of an imagesetter and a printing press, but this scheme is inflexible and clumsy where several imagesetters and presses may be used in various combinations. Also, you cannot account for absolute density variations.

A more flexible approach, and one provided by the RIP, is the ability to produce and use a calibration curve for each color of a printing press, applied separately from film linearization. This improves the accuracy and ease of compensating for the dot gain of, for example, Harlequin Dispersed Screening (HDS). HDS screens gain more on press than conventional screens. Calibrating the press for use with an HDS screen replaces a laborious and approximate compensation previously possible only by changing the film linearity settings or scanning with HDS in mind. Note that although an imagesetter is not a multi-color device, you can create a separate calibration curve for each color, to take account of the different screen angles.

See “Press calibration” on page 395 for details of press calibration.

10.3 Calibration in the Harlequin RIP

The calibration facilities allow several ways of working:

- You can measure calibrated or uncalibrated targets.

  This means that you can print a calibration target with the previous calibration applied and enter only the values that are in error—possibly saving time and materials. Alternatively, you can start again with an uncalibrated target as if no calibration exists. See “Establishing a workflow” on page 388 for a discussion of the advantages and advisable controls.

- You can create a separate calibration curve for each channel of multi-color devices, for example color ink jet printers and printing presses. If the output device or printing press supports additional colorants, you can create separate calibration curves for spot colors.

  Although an imagesetter is not a multi-color device, you can create a separate calibration curve for each color, to take account of the different screen angles.

- If you are preparing a job for a printing press, you can create separate calibration curves for output to film and output to a printing press. If you are not using Harlequin ColorPro, you can retarget a job from its intended printing press to another printing press, using a separate calibration set to remove the compensation for the gain of the intended press. See “Press calibration” on page 395 for a discussion of the background issues.

- Tone Curves allow you to make another set of color adjustments, in addition to the device calibration and the press calibration. See “Tone curves” on page 394 for details.

- You can use different measuring systems, as appropriate for the kind of output device and measuring instruments.

Additionally, these features are arranged so that is easy to add and use the advanced facilities provided by the ColorPro options. The extra facilities and changes of procedure associated with ColorPro are described in the separate *Harlequin ColorPro User’s Guide*.

10.3.1 Accessing calibration functions

The Harlequin RIP **Output** menu contains the **Print Calibration** and **Calibration Manager** commands. The Calibration Manager is also available from an icon button alongside the **Calibration** pop-up menu in the Edit Page Setup dialog box.

Use the **Print Calibration** command to display the Print Calibration dialog box. From here, you can print test strips (targets) which enable you to measure the characteristics of your output devices.

Use the **Calibration Manager** command to display the Calibration Manager dialog box. This allows you to create and edit calibration sets using measurements from test strips or published figures, and to enable or disable the use of particular calibration sets. The consequence is that you can adjust for day-to-day or printer-to-printer variations in ink density and similar variations in the exposure of imagesetters and platesetters.

10.3.2 Calibration sets

A *calibration set* is a piece-wise linear curve that maps requested tint levels to actual tint levels and has some associated information including the intended output resolution, exposure, dot shape, range of screen frequency, and negative / positive settings that the calibration set has been prepared for. Whenever you select one or more calibration sets in the Edit Page Setup dialog box, the RIP uses those calibration sets to output jobs.

10.4 Example procedure

The following procedure outlines basic cases in which you can create and apply a calibration set for a simple monochrome or color device driven directly by the RIP. The same principles apply to more complex cases involving color devices and printing presses.

10.4.1 Devices and requirements

Although an imagesetter is not a multi-color device, you can create a separate calibration curve for each color, to take account of the different screen angles.

To create calibration sets, you need a reliable and accurate densitometer that is reflective for paper and transmissive for film. The densitometer that you select should ideally display dot coverage in percentage terms, rather than simple density readings, since calculating coverage by hand is time-consuming and prone to errors.

10.4.1.1 Devices requiring exposure settings

The procedure for a device such as an imagesetter needing a correct exposure setting is:

1. Where appropriate, establish the correct exposure for the device.
2. Print and measure a calibration target.
3. Use an Edit dialog box to enter the data and label it with the information describing its use. You may also want to inspect the resulting curve and smooth or edit the data values. This is where you name the calibration set.
4. Apply the calibration set you have created and check that it provides good output.

Section 10.4.2 on page 379 through Section 10.4.5 on page 387 describe these steps in more detail.

10.4.1.2 Devices without exposure settings

The procedure is simpler for a device that does not have an exposure control, such as a color inkjet printer supplied with reference calibration sets.

Note: It is *very* unlikely that you will achieve good results if you try to use an inkjet printer without a reference calibration set (or other control of ink delivery). The typical response of an inkjet printer in its raw state is to produce very dark images and deliver so much ink that there are severe problems with drying time or ink running across the printed page.

Supplied reference calibration sets or calibration profiles define an ideal or ‘reference printer’. Using a reference calibration set greatly improves output, but the response of your printer (the ‘user printer’) may differ from the reference printer because of small but inevitable variations between printers. You

may be satisfied with the reference calibration. To obtain the best output you can calibrate the user printer so that it responds in the same way as the reference printer; this produces your own calibration set that you can use in your page setup, and edit or update as required.

When you create a page setup the **Calibration** entry must match the combination of device, media, and resolution being used. This is true for both supplied calibration profiles and your own calibration sets.

Note: You can tell apart supplied calibration profiles and calibration sets that you have created because most supplied calibration profiles appear in the Edit Page Setup dialog box with parentheses ( ) around the name shown in the **Calibration** list. See the documentation for the relevant output plugin if you are in any doubt about identifying the entries in the **Calibration** list.

The page setup you use to print a target can use either kind of **Calibration** entry:

- To create your own calibration set for a device for the first time your page setup must use a supplied calibration profile for the device.
- To edit your own calibration set your page setup must use that calibration set.

Once you have identified or created an appropriate page setup, follow the steps below to print a target using this page setup:

1. Use the menu option **Output > Print Calibration** and choose your page setup in the **From Page Setup(s)** list.
2. Choose the type of target that you wish to print from the **Print For** menu. `Process Colors only` is often suitable. See Section 10.10 on page 401 for details of all these options.
3. Prepare your printer—for example by loading the correct paper and click **Print uncalibrated target**. (Enable output in the Output Controller if necessary to get a printed target.)

   Note: You must print the target on the paper for which the calibration profile or set was created in order to obtain an accurate calibration set.

4. Wait for this target to dry thoroughly before attempting to measure it. Even when a target appears dry, It can take ten minutes or more for some combination of inks and media to stabilize completely so that the colors are no longer changing and the target is unaffected by handling.

You can then follow the rest of this overall example procedure from Section 10.4.3 on page 383.

10.4.2 Choosing the correct exposure

For devices such as imagesetters where calibration is performed with respect to dot area coverage, the first step is to ensure that your output device is set up with the correct exposure. Attempting to calibrate an imagesetter with badly adjusted exposure settings will waste a lot of time and film, and may lead to undesirable effects at plate-making time, such as variable dot gain. Run a series of test pages at varying exposures to determine the setting required to give a solid black and a clear white.

You are likely to need to select a different exposure for each combination of media and resolution. Halftone frequency and dot shape will not affect required exposures significantly. However, the media and the chemistry of the developer used can make a big difference: stable developer chemistry is very important for accurate calibration.

10.4.2.1 Printing exposure tests

Choose an appropriate page setup. This should set the correct output device, output resolution, and negative / positive settings, dot shape, and screening details if appropriate. The dot shape and screening details are set in the separations style of the page setup. The exposure is unimportant at this stage: you will override it to make the test print. Section 10.4.3 on page 383 describes how to create a calibration set for this page setup.

Note: If you are using a drum device with variable film feed, you will usually want to rotate the page or select film saving when printing test strips. See “Media saving option” on page 162 for details.

Choose **Output > Print Calibration**. The RIP displays the Print Calibration dialog box, shown in Figure 10.2.

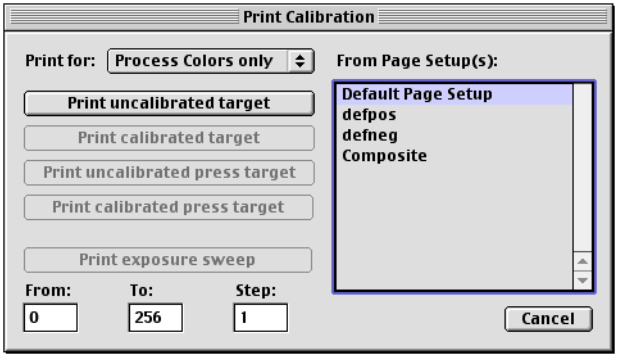


Figure 10.2 Print Calibration dialog box

Select an appropriate page setup in the **From Page Setups** list.

Note: If you forget to choose a page setup, the RIP uses the one that you chose last time you used the **Print Calibration** command. If you have not used the **Print Calibration** command in this RIP session, the first page setup in the list is used. To change the order of this listing, see “Reordering page setups” on page 117.

Note: Some settings in the chosen page setup are ignored or altered—notably those in a ColorPro color management option that would change the color of a graphic object.

Each button creates a slightly different target (test strip) or series of targets. To create the appropriate series of targets for the example procedure, you need to set up some values and then click **Print exposure sweep**.

Note: If your output device does not support software exposure control, run the tests manually instead, according to your output device manufacturer’s instructions. Typically: set the exposure manually, click **Print uncalibrated target**, and repeat for each exposure value.

Print exposure sweep uses the values in the associated **From**, **To**, and **Step** text boxes to print test strips at each of several exposures in the range.

10.4.2.2 Messages

From version 5.5 calibration is installed differently however, the end result is the same as previous versions with the exception of a few extra messages.

Calibration and color management is setup as normal when running a calibration target. This is different to previous behavior where it was not setup. At the start of the target procset, everything that has to be turned off is turned off.

The target procset now gets information about its environment from PostScript data in `setcalibration` and various color management operators. Therefore, calibration and color management must be setup normally for this information to be present.

A manifestion of this is that when running calibration targets the normal messages for calibration and color management are displayed, followed by a number of extra 'switched off' messages, for example:

```
Setup loaded: "Default Page Setup"
Starting Job On Tuesday, April 24, 2001 10:27:13 AM
Using Color Setup "testing"
Using calibration for device "Glossy Photo Hvy 720"
Color management switched off for calibration job
Tone curve calibration switched off for calibration job
Intended press calibration switched off for calibration job
Actual press calibration switched off for calibration job
Device calibration switched off for calibration job
Running Uncalibrated Target for Default CMYK + spot colors target:
```

Only the relevant messages appear, that is, if color management is not enabled, its 'switched off' message will not appear.

10.4.2.3 Acceptable exposure values

The ranges of values that you can enter into the **From**, **To**, and **Step** text boxes are dependent on the output device. On several types of device, the values do not form a continuous range. Read the manual for your output device carefully before entering any values.

The Harlequin RIP makes exposure tests over a range of exposure values by starting at the first exposure value that you want to produce, and then at regular steps up to and including a last exposure value. For example, if you want

to print test pages at exposure settings of 120, 125, 130, and 135, then type 120, 135, and 5 into the boxes. Typically, each test page is just over 2 inches long.

Care: If you are using an output device where increasing exposure values do not necessarily mean increasing laser intensity smoothly at the film surface, take care in selecting the settings for this dialog box. If necessary, print out two sweeps—for example, 225 through 230 and 100 through 120.

10.4.2.4 Checking the target

Each of the test pages should look like that in Figure 10.3 unless you choose a composite 'Separations, Screening & Color' Style in which case you will output a vertical exposure test page with all colors on a single page. In addition, if you choose CMYK halftone output you will produce four individual test pages, one for each separation. (Test pages designed for use with densitometers that move the media automatically may look slightly different, often having one strip of *patches* for each color, and it is possible to have custom targets supplied with each output device driver.)

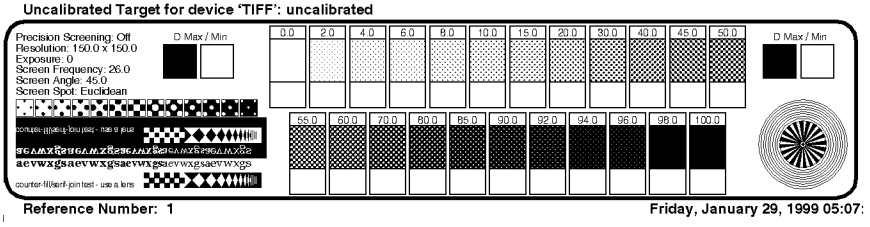


Figure 10.3 Uncalibrated exposure sweep test page

If you have a densitometer, select the correct exposure by reading the density values of the two squares labeled *D Max/Min* on each of the test pages from your exposure sweep. (Measure both squares to check for a uniform exposure across the page.) Optimum density varies from material to material, but generally a densitometer reading of between 3.5 and 4.0 is acceptable for film, and between 1.8 and 2.0 for paper. (The densitometer should of course be switched to give density readings rather than dot percentage readings.)

If you do not have a densitometer, you can still use this page to select an approximate exposure setting: study the fine detail in the bottom left of the page, and select the exposure that gives clear, fine white detail in black areas and vice versa. As an additional guide, you should be able to tell the differ-

ence between the 0% and 2% tint panels, and between the 98% and 100% panels. (These figures are for film or bromide: inkjet output can be black from the 80% patch upwards.)

Keep the strip that you decide has the right exposure: you can measure values from it to create the calibration set. If you think a value falling between those used in your exposure sweep might be better, print a new target at that exposure. For example, set **Exposure** in the Edit Page Setup dialog box and then use **Print uncalibrated target**. You can only set the **Exposure** in the Edit Page Setup dialog box if your output device supports software exposure control, otherwise the option is grayed out.

10.4.3 Creating a calibration set

You can create a calibration set after you have measured data from a target or obtained it elsewhere: for example, from a manufacturer's specification for the device.

Choose **Harlequin RIP > Page Setup Manager**. The RIP displays the Page Setup Manager. Select the page setup for which you printed the exposure test (or single calibration target) and click **Edit**. In the Edit Page Setup dialog box, set the **Exposure** to the chosen value. If your output device does not support software exposure control, the **Exposure** option is grayed out and you may have to set the exposure manually.

Click the **Calibration Manager** button to open the Calibration Manager, shown in Figure 10.4. This button is next to the **Calibration** and **Tone Curves** pop-up menus.

Calibration sets are grouped by device and by color space. When you open the Calibration Manager from the Edit Page Setup dialog box, the RIP displays the calibration sets for the current device and current color space, if any have been created. The choice of separations style determines the color space. When you first open the Calibration Manager after installing the RIP, the list box is empty.

If you open the Calibration Manager using the **Output > Calibration Manager** command, select the appropriate device from the **Device** pop-up menu and, if necessary, select a color space from the **Color Space** pop-up menu.

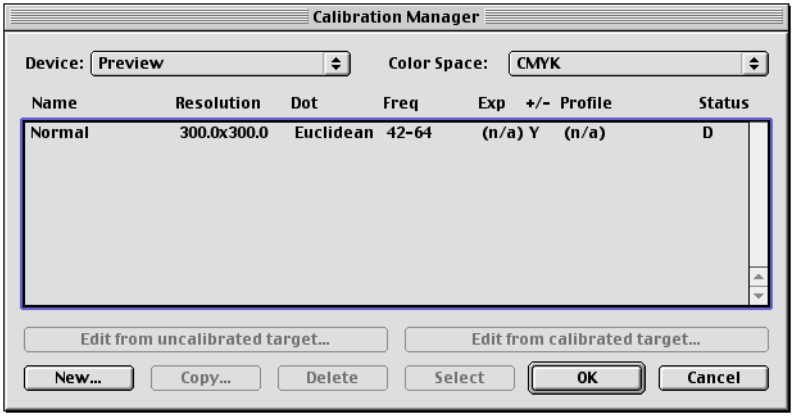


Figure 10.4 Calibration Manager dialog box

The column headings are various properties of a calibration set. The first column in the list is the name of the calibration set and the last column is the edited or unedited status of the calibration. Each of the remaining columns in the list corresponds to the name of one of the warning criteria in the Edit Calibration dialog box. See “Calibration Manager dialog box” on page 403 for full details.

Click **New** to create a new calibration set for the first time. The RIP displays an appropriate version of the Edit Calibration dialog box.

Subsequently, you will probably edit the set, as described in “Editing calibration sets” on page 388.

10.4.4 Entering the data

When you edit a calibration set, the RIP displays the dialog box shown in Figure 10.5.

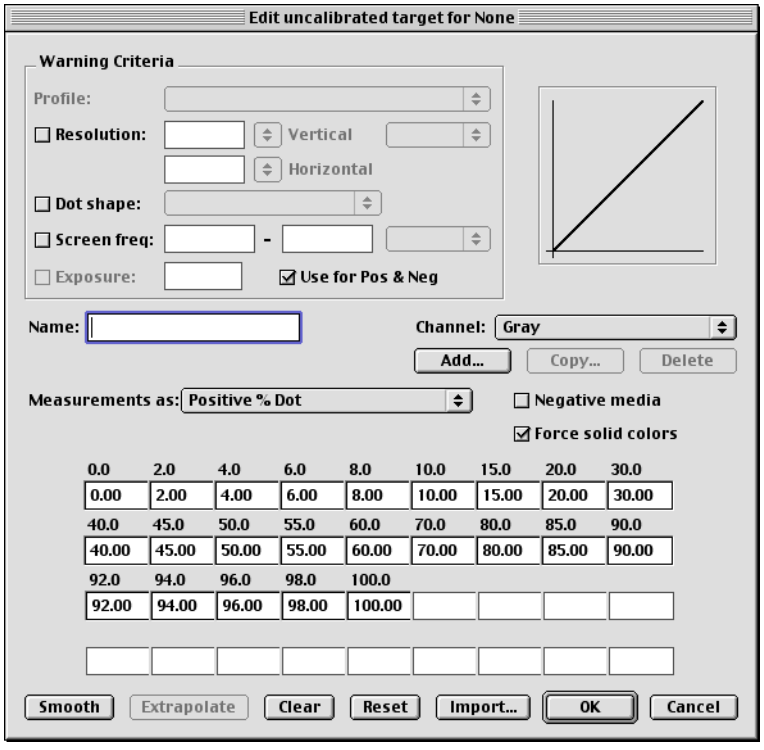


Figure 10.5 Edit Calibration dialog box

For version 5.5r1 the way calibration works has been changed. All calibration sets created before v5.5r1 will work in the same way they always have. However, if you decide to edit a calibration set created before v5.5r1 with a v5.5r1 RIP (or later) or create a new calibration set, the values will be automatically adjusted to account for the application of the default curve to the calibration. The default curve is a linearization profile of the output device. Previously, the default curve was only taken into account when the calibration set was first created and not after editing. From v5.5r1, the default calibration curve is always taken into account.

If you leave the Edit calibration dialog by selecting **Cancel** the new values will not be saved and the calibration will work as before. If however, you decide to save the new values the calibration will work using the default curve and will produce more accurate results.

When you click **New** to create a new calibration set, you enter the Edit Calibration dialog box for an uncalibrated target with all **Warning criteria** boxes empty. The warning criteria list the resolution, dot shape, screen frequency, and so on that this calibration set is intended to work with.

At least, you must:

- Name the new calibration set.
- Show what kind of values you are measuring.
- Provide data values.

You should also use the **Warning criteria** boxes to show which settings the calibration set is intended to work with.

"Edit Calibration dialog box" on page 409 describes how to use all the items in this dialog box, but this short procedure mentions the essential items:

1. Type a name into the **Name** text box.
2. Choose the type of measurement you are making from the **Measurements as** pop-up menu drop-down list.
3. Measure the dot coverage percentages from densitometer readings taken from the target that you chose in the procedure "Choosing the correct exposure" on page 379 and enter these values into the labeled boxes for calibration data. (The **Import** button allows you to import data values taken from a file, which can be generated by a separate program, Genlin. See Appendix C, "Using Genlin" on page 503 for use of the program and see page 417 for details of how to read the file.)

   Note: Each value you enter must be consistently greater than the preceding value (or less than it if you are using a negative film or meter).

   The **Smooth** button allows you to smooth the ends of the graph (and by doing so, the values of the calibration set) in small steps. If a set of values are out of range or non-monotonic a warning will appear when you try to exit from the dialog.

4. In the **Warning Criteria** panel, enter the settings used to create the target: resolution, dot shape, screen frequency, exposure, and say whether it applies to both negative and positive settings.

   Note: If you create a calibration set from the Edit Page Setup dialog box, you need only select the **Warning criteria** check boxes. The RIP takes the default settings from the page setup you are editing.

Click **OK** to save the calibration set.

You can create a new calibration set, or save all the changes you have made to date by clicking **OK** in the Calibration Manager.

You can create or edit a calibration set in the Calibration Manager, even if you do not want to use it in the current page setup. Once you have saved the new calibration set by clicking **OK** in the Calibration Manager, it will remain even if you **Cancel** the Edit Page Setup dialog box. If you opened the Calibration Manager from the Edit Page Setup dialog box, you can also save the changes by clicking **Select**. In addition to saving the changes, using the **Select** button displays the selected calibration set in the **Calibration** control in the Edit Page Setup dialog box.

If you click **Cancel** in the Calibration Manager, you discard all changes to calibration sets that you have made since you opened the Calibration Manager.

When you edit a calibration set for color data, the procedure is very similar, except that you must enter data for each color channel. Note that although an imagesetter is not a multi-color device, you can create a separate calibration curve for each color, to take account of the different screen angles.

10.4.5 Applying the calibration

You must select a calibration set from the **Calibration** pop-up menu in the Edit Page Setup dialog box in order to use it. Subsequently, you can save the page setup and recall both the page setup and its corresponding calibration set as required.

Select your new calibration set in the Edit Page Setup dialog box, and click **OK** to save your changes and close the dialog box. Click **OK** in the Page Setup Manager.

Return to the Print Calibration dialog box, choose the page setup in which you have chosen the new calibration set, and click **Print calibrated target**. You should see improved tonal rendering in the calibrated target.

Measure the tint values on this calibrated target. If the values are wrong in any patches, reread these tint patches on the original exposure sweep target, and edit the values in the calibration set again.

10.5 Editing calibration sets

The procedure described in Section 10.4 is adequate for creating new calibration sets. This section describes how you can choose a strategy to keep calibration up to date, choose which calibration sets to use, and edit existing calibration sets.

There are three more general sections: Section 10.6 on page 392, discusses establishing and maintaining calibration; Section 10.7 on page 394 describes tone curves calibration; and Section 10.8 on page 395 describes press calibration.

For details of the individual dialog boxes, see “Print Calibration dialog box” on page 401, “Calibration Manager dialog box” on page 403, and “Edit Calibration dialog box” on page 409.

They way that calibration is applied is different for v5.5r1. If you decide to edit a calibration set created before v5.5r1 with a v5.5r1 RIP (or later) you may notice some small differences. For more information see “Entering the data” on page 385.

10.5.1 Establishing a workflow

There are three possible workflows for maintaining calibration:

- Historical record.
- Recalibrate every time.
- Adjust for drifts in calibration.

It is usually best to use the same method for any one device. It is possible to change from one to the other, but you may see values in the Edit Calibration

dialog box which, though correct predictions, are not values you recognize because they have been calculated by the RIP.

Historical — Sometimes it is desirable to keep a historical record of calibration sets. In this case, an uncalibrated strip or target is printed on each occasion when calibration is carried out, and a new calibration set created (with the **New** button). The new calibration set must be selected explicitly in the Edit Page Setup dialog box each time.

Recalibration — This is the conventional method. Here an uncalibrated strip is printed each time calibration is required. On the first occasion, a set is created with **New**. On subsequent recalibrations, **Edit from uncalibrated target** is selected and the values in the dialog box changed to reflect the new readings from the strip. Then a calibrated strip is printed and the linearity of the result is checked, and if the linearity is unsatisfactory another uncalibrated strip is printed to correct the flaws. (The new calibration values are in the existing set, so there is no need to select a new calibration set in the Edit Page Setup dialog box.)

Adjustment — Here a calibrated strip is printed on each occasion (except the first when an uncalibrated strip is printed to enter the values with **New**). **Edit from calibrated target** is selected. This should then show the *perfect* values. If the device has changed, these values will be a little in error and the new values can be entered. A second calibrated strip can be printed to check the result. (Again, the new calibration values are in the existing set, so there is no need to select a new calibration set in the Edit Page Setup dialog box.)

Note: When working in density rather than percent dot, it is not immediately obvious what the correct values should be; **Edit from calibrated target** provides this information.

However, whatever method is adopted, the most important rule is to match the edit command to the type of target. To be explicit:

- When entering measurements using *uncalibrated* test strips, always do so with **Edit from uncalibrated target** (or **New**).
- When using *calibrated* test strips, always do so with **Edit from calibrated target**.

Calibration will be completely wrong if you do not follow this rule.

10.5.2 Variations on the Edit Calibration dialog box

When you edit a calibration set, the RIP displays the dialog box shown in Figure 10.5, page 385. This dialog box lists the resolution, dot shape, screen frequency, and so on that this calibration set is intended to work with. You can change these settings as necessary. See "Edit Calibration dialog box" on page 409 for details of all controls.

There are variations on this dialog box for calibrated and uncalibrated targets and for tone curves, printing presses, and other devices. These variations include the nature of the values you enter to define the curve and the color channels you can select.

The title of the dialog box changes to show the kind of target and the device. The general form of the title is:

Edit <*calibrated/uncalibrated*> target for <*Device name*>

<*calibrated/uncalibrated*>
: depends on which edit button you clicked in the Calibration Manager.

<*Device name*>
: is the selection in the **Device** pop-up menu in the Calibration Manager.

When you edit the calibration set for a printing press, the differences are:

- The presence of a **Press** pop-up menu in the Warning Criteria panel. In this case the default calibration set is determined by the selected profile.

- The types of measurements available in the **Measurements as** pop-up menu.

When you edit the calibration for tone curves, the differences are:

- The options in the Warning Criteria panel are unavailable (except for the **Use for Pos & Neg** option for monochrome devices).
- The **Force solid colors** option is unavailable.

10.5.3 Choosing and labeling calibration sets

It is important to choose a calibration set that is appropriate for the job you are processing. If you set the warning criteria for a calibration set, the RIP warns you if the settings in the page setup or job conflict with these criteria. By setting a page setup option, you can tell the RIP to abort any job that fails the criteria. See Section 10.12.3 on page 411 for details.

Name the calibration set carefully, so that you can identify all the parameters associated with it. For example, it may not be sufficient to name the calibration set with the chosen resolution, since the dot shape and line frequency could also affect the calibration.

Most settings have obvious single values. Screen frequencies and positive / negative settings need some discussion.

Screen frequencies are given as a range to indicate the range of frequencies for which the set is valid. It is a good idea to start by working out which frequencies you expect to use—for example, 85, 100, 112, 120, 133, 150, 175 lpi, and so on. You can then create ranges centered on each of these values—for example, 75 to 93 lpi, 93 to 106 lpi, and so on. You do not have to create calibration sets for the full range of frequencies—you may find, for instance, that the lower frequencies do not need calibration, either because the output device is fairly accurate at these values, or because the work you do at those frequencies does not demand accurate output. Also, it may be that the same calibration set will apply to a wide range of frequencies—for example, 100–300 lpi.

You must inform the RIP about the various combinations of positive and negative output and measuring devices.

The **Measurements as** pop-up menu allows you to tell the RIP which densitometer mode you used when performing your density readings. Some densitom-

eters read in *positive dot*, others in *negative dot* (that is, a clear area may read 0 (zero) or 100).

For a monochrome device, you can specify what kind of output you are measuring using the **Negative media** check box.

The **Use for Pos & Neg** check box allows you to record whether the RIP can use this calibration set for both positive and negative output, or only one. The default setting of this box (selected) is usually the best to use, but for very accurate calibrations, apply this setting only to Euclidean dot shapes. (See Chapter 5, "Screening" for a description of Euclidean screening.) When this check box is not selected, the RIP uses the calibration set only for positive or negative, as set in **Negative media**.

10.5.4 Saving calibration sets

Click the **OK** button to save the calibration set. You can then edit a different calibration set, create a new calibration set, or save all the changes you have made by clicking the **OK** button in the Calibration Manager. If you opened the Calibration Manager from the Edit Page Setup dialog box, you can also save the changes by clicking the **Select** button. In addition to saving the changes, the **Select** button displays the selected calibration set in the Edit Page Setup dialog box.

If you click the **Cancel** button in the Calibration Manager, you lose all the changes to calibration sets that you have made since you opened the Calibration Manager.

10.6 Consistency of calibration

Once you have produced a number of calibration sets for a device, you must be sure that they continue to be accurate to an acceptable degree, and that you use them appropriately. This section describes what to do and check in routine use.

10.6.1 Checking calibration

Once you have produced a calibrated output successfully, you need only check that the calibration remains stable. Do this at suitable time intervals,

which may vary from twice a day to once a month—depending on your requirement for accuracy and what you learn about the stability of your systems.

Even if you check calibration sets only occasionally, always check them when your imaging or processing environment changes—for example, when you load film, ink, or ribbon from a new production batch, or change your processor speed or temperature. In many cases, it may also be advisable to check exposure settings.

To check the calibration, click **Print calibrated target** in the Print Calibration dialog box and measure the density of the tint panels.

If the value for any tint panel drifts outside your acceptable range, you can use data from the calibrated target to correct the calibration set. You need record only the values that are in error. Display the Calibration Manager dialog box, select the calibration set, and then click **Edit calibrated target**. In the Edit Calibration dialog box, enter the newly measured value or values. (Alternatively, you can click **Print uncalibrated target** in the Print Calibration dialog box, read *all* the densitometer values from that target, and then use **Edit uncalibrated target** to edit the calibration set appropriately.)

10.6.2 Assessing attainable accuracy

It is relatively easy, using these procedures, to maintain the accuracy of calibration data on an imagesetter using film. This accuracy can be within 2% of a perfect result. The accuracy obtainable with bromide paper is far lower, and it is not feasible to maintain densities closer than about 5%. (One reason for having a less accurate requirement for bromide paper is that two densitometers are likely to show much larger differences when measuring the same piece of paper, than when measuring the same piece of film.)

When assessing your required level of accuracy, take into account the accuracy of the imaging engine itself: an imagesetter rated as having a variation of *less than 2%* across the film cannot be expected to be able to produce work calibrated more closely than this.

Some reasons for inaccurate imaging are:

- A coarse screen may not be able to reproduce an exact percentage value or may provide varying readings depending on where in a patch a density reading is taken.
- Values intermediate between patch values are interpolated. This process is never perfectly accurate.
- Some imaging technologies produce variations in tones depending on where in the page the tones are located, and some produce output that depends on the tones in neighboring areas of the page.

Other, variable, factors that can significantly affect calibration results include the following:

- The temperature (especially the consistency of the temperature) at which the imagesetter and the film processor are maintained.
- The length of time and the temperature at which film, paper, or ribbons are stored.
- Whether the processor is used for other materials (for example, duplication film) as well as imagesetter film.
- The time between photographic processing and measurement. Many films have a colorant that fades rapidly after processing.
- The time and storage conditions between printing and measurement. The output from inkjet and dye-sublimation printers can alter significantly over a period of weeks, or even hours if subjected to bright sunlight.

Reasonable calibration can normally be achieved easily, but for very high quality calibration a considerable amount of care in setting up and controlling the imagesetting environment is required.

10.7 Tone curves

Tone curves allow you to make another set of tone or color adjustments, in addition to the device calibration and the press calibration. In a properly controlled workflow you should have little need to use tone curves but you may find that they offer a quick and effective way of working around short-term

difficulties such as lack of calibration facilities or badly formed jobs that you cannot easily correct in the job.

For example, you may have to process a particular set of images where the correct calibration does not produce an acceptable printed result. There are two common cases. You may be able to produce a tone curve using exact data, perhaps coming from a known setting in scanning or later processing. Alternatively, you may wish to emphasize a color or tonal range in response to artistic direction, such as a request to boost the mid-tone magenta component by 10%.

In all cases, the tone curve is an exact record of what you have done, kept separate from the device and press calibrations.

10.7.1 Creating and using tone curves

To create tone curves, select the `Tone Curves` device in the Calibration Manager. Create the calibration set for the tone curves in the usual way, entering data values for the patches and possibly using **Smooth**.

You apply tone curve calibration sets using the **Tone Curves** pop-up menu in the Edit Page Setup dialog box.

For the Harlequin RIP version 5.1 revision 1 and later, tone curves behave in the *opposite* sense to device and actual press calibration curves. This normally means that you enter higher values where you wish to see more output.

For example, assuming a positive-reading system where 0% is no output and 100% is full density or coverage, enter values *higher* than the nominal values of the patches to produce more output for a given input.

Note: In the Harlequin RIP version 5.1 revision 0 and earlier, tone curves behaved in the same sense as device and actual press calibration curves; in these earlier versions, for the example just given, you had to enter *lower* values where you wished to see more output.

10.8 Press calibration

Press calibration allows the RIP to make press adjustments to the density of the ink on paper on a printing press independently from the intermediate medium (usually film) used to prepare printing plates.

Press calibration can also be set up to work in absolute density measurements instead of halftone dot area coverage, which means the actual color can be predicted rather than just its relationship to the maximum and minimum densities, as on film.

Press calibration provides these facilities:

- The press can be put into the same state as some reference state.

  Though this can often be achieved by adjusting press controls, the RIP provides a finer degree of tuning than just the maximum density or mid-tone controls common on the press.

- The press can be accurately tuned for Harlequin ColorPro.

- An adjustment can be made for a different press from the one for which the job was originally prepared.

  This might be needed because it really is a different machine, or because the dot-gain characteristics have changed over time: for example, as the blankets have worn.

- An independent adjustment can be made to compensate for changes to the job after scanning and so on, which affect the gain on press, such as substitution of HDS screens.

- The gain of the press can be expressed in relative terms.

  This form is common in manufacturers' documentation: for example *20% at 70%*, rather than the more common measure on film as *70% reads 90%* (which is equivalent).

- Readings can be estimated from a small number of data points supplied by the manufacturer.

10.8.1 How does press calibration work?

Conventionally, a color job is prepared by combining scanned pictures with application-generated text and graphics. In this process there are two assumptions made:

- The film to which the resulting raster will be first directed is linearized, that is if the job requests a 25% gray value, a densitometer would read 25% on that area of the film.

- The press will gain further—a lot further usually—and the scanner operator takes this into account when preparing a scan. This means the scanner operator must know or guess the gain of the target press. It also means that the colors in application-generated graphics are similarly produced by guesswork, experience, or by reference to samples printed on a similar press (previous work, or more likely chosen from swatches in an appropriate PANTONE Color System or from a system with a similar intent).

The consequence is that if the gain of the press is not as expected, then the job will not print correctly. This might be because:

- It is not the press originally intended.
- The dot gain has changed (or was never known).
- The dot gain was assumed for some particular rendering process, which has changed.

  For example, you may be using a HDS screen which gains more on press than conventional screens. The film can be linearized as normal, and a further adjustment made to account for the difference between the HDS screens and the conventional screens. By separating the two adjustments, it is now possible to linearize to film again without having to repeat the whole process.

Whichever of these reasons holds, the job has the gain of the press already accounted for. This means that the overall effect of calibration in the output path is to first apply any primary calibration to remove compensation for the gain of the intended press, and then to compensate for the gain of the actual press.

Note that the intended press calibration is not available when ColorPro is enabled. Instead, ColorPro provides several options for processing color data ahead of the transfer to press: these options include emulating the output of one press on another type of press. For details, see the separate *Harlequin ColorPro User's Guide.*

For this reason, the process is split in two:

1. You give the gain (expressed as a calibration set) of the intended press, which may be one of:

   - A *standard* press
     Some standard presses are built in to the Harlequin RIP.
   - A variation on a *standard* press
     A typical variation is, for example, an extra 5% gain at 50% over SWOP Type 1 printing but with essentially the same shape of gain curve. You can create such calibration sets in the RIP by extrapolation from the standard curves provided with the RIP.
   - A real press
     This press might be one of a group of similar presses, another of which may be used to print the job. Alternatively, this same press may actually print the job, but can no longer print with the same gain as assumed when making the scans.

2. You give the gain of the actual press. The calibration here is expressing the adjustment needed to put the press back into its reference state (what the press looked like when first calibrated), which is not usually a linear state, but the characteristic dot-gain curve of a printing press.

The RIP can then do the calculations which account for the difference. This separation allows the actual press behavior to be accounted for without needing to remember what differences to apply manually.

10.8.2 Alternative uses of press calibration

It is also possible to work in two alternative ways, which are uncommon at present, but which we expect to become more common in the future:

- Scan to linear
  Here the scanned images and application graphics are produced assuming the measured response of the press, rather than the film, will be linear. The RIP provides a special (`None`) calibration set which can be used as the *intended press* for use in this situation.

- Press is linear
  Here the press is indeed set up to produce a linear response, but the job is not expecting this. In this situation, the (None) calibration set would be chosen for the actual press, or more likely some calibration set, derived from (None), that will bring the press back to its required linear state. This is similar to printing to a full-color desktop printer.

Of course, it is possible to work with both of these ways simultaneously.

Note: Earlier versions of the Harlequin RIP used (Linear) not (None), as explained in Section 10.8.4 on page 399.

A special case of linear scans is device-independent color data—images where the colors are expressed in CIE L*a*b* for example, or held on Photo CDs in YCC format. Here, Harlequin ColorPro is required to accurately reproduce the intended color, and in this case only the *actual press* calibration set is used. This is also the case if CMYK colors are converted to device-independent colors first by ColorPro—in that case the gain incorporated in the job is accounted for during the conversion by ColorPro.

Lastly, note that press calibration is not a substitute for ColorPro. Calibration can compensate for changes in response of the individual process colors, but it cannot account for variations in colors of inks and dyes. Therefore if the actual and intended presses are significantly different processes (a proofing device and a press for example, or two entirely different kinds of press), the colors cannot be accurately reproduced using only calibration.

10.8.3 Direct to press

There are two ways of calibrating for working direct to press.

- You can assume a linear imagesetter and calibrate for the actual press as normal. In this case, set the device calibration to linear: (None).
- You can assume a linear actual press and calibrate for the device as normal. In this case, set the actual press calibration to linear: (None).

10.8.4 Version history: Linear and None

In versions of the Harlequin RIP up to and including version 5.1 revision 0, the list of options for **Intended Press** and **Actual Press** included the (Linear)

entry. In all usage, selecting the (Linear) entry had the same effect as choosing (None).

The Harlequin RIP version 5.1 revision 1 and later do not have a (Linear) setting The default options for **Intended Press** and **Actual Press** are (None).

Note: If you use the Migrate utility to transfer settings from a Harlequin RIP installation of version 5.1 revision 0 or earlier to a RIP installation of version 5.1 revision 1 or later, any use of (Linear) is mapped to (None).

10.9 Using a combination of calibration sets

If you are printing to a direct output device, the page setup can include a calibration for the output device and a tone curve calibration. The RIP applies any calibration sets specified in the page setup in this order:

1. The **Tone Curves** calibration.
2. The device **Calibration**.

If you are preparing a job for a printing press, the page setup can include an imagesetter calibration, a tone curve calibration, and calibrations for the intended and actual presses. The RIP applies any calibration sets specified in the page setup in this order:

1. The **Intended Press** calibration (to remove compensation for the gain of the intended press).
2. The **Tone Curves** calibration.
3. The **Actual Press** calibration (to compensate for the gain of the actual press).
4. The device **Calibration** (the calibration for the imagesetter).

The **Intended Press** calibration is not available when ColorPro is enabled. Instead, ColorPro provides several options for processing color data ahead of the transfer to press: these options include emulating the output of one press on another type of press. For details, see the separate *Harlequin ColorPro User's Guide*. The calibration set specified in **Actual Press** is always used.

From version 5.5r1 the default curve, which is a device correction curve, is applied before any other calibration.

10.10 Print Calibration dialog box

Choose **Output > Print Calibration** to display the Print Calibration dialog box, as shown in Figure 10.2, page 380.

You can select which page setup to apply while printing a test strip or exposure sweep by choosing an entry from the list in this dialog box. If you select several entries then, when you click the button to print the appropriate target, the RIP prints one test strip or exposure sweep for each page setup you have selected.

Note: Some settings in the page setup are ignored or altered—notably those in a ColorPro option that would change the color of a graphic object.

There may be different, distinct targets for each output device or type of device.

If the output format supports additional colorants (spot colors), you can choose to print the calibration for `Process Colors only`, `Spot Colors only`, `Process & Spot Colors`, or for `Monochrome only` by selecting from the **Print for** pop-up menu. The output format is determined by the separations style of the page setup.

The `Monochrome only` option supports calibration of a monochrome device such as an imagesetter. Choose this option to print a single calibration strip for a page setup that normally generates separations. (This ability removes any need to produce a page setup used only for calibration.)

10.10.1 Buttons

Clicking a button prints at least one calibration target, and more if you have selected several page setups using the **From Page Setups** list, as described in Section 10.10.2. The options are:

Print uncalibrated target

Prints a target without using a calibration set—even if the selected page setup has one or more calibration sets associated with it.

Print calibrated target

Prints a target using the calibration set or sets associated with the selected page setup. If the output device has not changed since the calibration set was created then the nominal density values and the measured ones should be the same.

Print uncalibrated press target

Prints a target for a printing press without using a calibration set. You must select a page setup that produces separated output.

Print calibrated press target

Prints a target using the calibration set or sets associated with the selected page setup. You must select a page setup that uses an **Actual Press** calibration set and that produces separated output. See "Press calibration" on page 395 for more details.

Print exposure sweep

Uses the values in the associated **From**, **To**, and **Step** text boxes to print test strips at each of several exposures in the range. This button prints an exposure sweep for each selected page setup, so be careful you do not produce more targets than you intend. This prints an exposure sweep without using a calibration set—even if the selected page setup has one or more calibration sets associated with it.

10.10.2 Other controls

These controls affect the contents and number of calibration targets produced by the buttons described in Section 10.10.1.

Print for

Choose the set of colors you wish to have printed on print test strips. You may see just one option, usually `Process Colors only`, in this list if your output device and the selected page setup do not support spot colors.

If the output format supports additional colorants, you can also choose to print the calibration for `Spot Colors only`, `Process & Spot Colors`, or for `Monochrome only`. The output format is determined by the separations style of the page setup.

From Page Setups

Select one or more page setups from this list, if desired.

From / To / Step

Print exposure sweep uses the values in these text boxes as, respectively, the first, last, and increment values of exposure when producing an exposure sweep. Take care to enter values so that the complete sweep corresponds to valid exposure values for your output device.

For example, values of `100`, `120`, and `5` produce a sweep with exposures of 100, 105, 110, 115, and 120.

To recap, the **From** box is the first exposure setting, the **To** box is the last exposure setting and the **Step** box is the size of the step. With values of, **From** `100`, **To** `150` and **Step** `5`. You will get 11 exposures from 100 to 150 in steps of 5.

Change the **Step** `5` to **Step** `10` and you will get 6 exposures from 100 to 150 in steps of 10.

10.11 Calibration Manager dialog box

Click the **Calibration Manager** button in the Edit Page Setup dialog box or choose **Output > Calibration Manager** to display the Calibration Manager dialog box, as shown in Figure 10.4, page 384.

This dialog box helps you create new calibration sets and manage your existing calibration sets. You can edit sets to keep them accurate by entering data from new targets or to adapt a copy of an existing calibration set: for example, to make it apply to a related group of settings. Finally, you can delete any entry in the list by selecting it and clicking **Delete**.

Calibration sets are grouped by device and by color space. When you select a device from the **Device** pop-up menu, the dialog box shows a list of calibration sets for that device and the currently selected color space. If necessary, select the appropriate color space from the **Color Space** pop-up menu.

The list of color spaces contains all the color spaces in which a separations style is defined for the device. For example, if the device has separations styles defined in the Monochrome and CMYK color spaces, then you can create calibration sets in the Monochrome or CMYK color space.

Most entries in the **Device** list are direct output devices—imagesetters, platesetters, proofing printers (and some preview options and file formats)—but there are also special entries for `Printing Press` and `Tone Curves`.

The ways in which you create and use calibration sets for these types of entry vary.

Direct output devices

> The way to create the calibration set is to print and measure a calibration target, as described in this chapter.
>
> To use a calibration set, in the Edit Page Setup dialog box, you can choose any calibration set that was defined for the current device and current color space, in the **Calibration** pop-up menu. The choice of separations style determines the color space. Although an imagesetter is not a multi-color device, the calibration set for an imagesetter contains a calibration curve for each color specified in the separations style, to take account of the different screen angles used for these colors.
>
> **Note:** A special example is the CIP3 output plugin. Its behavior with respect to calibration is like that of a printing press, because its purpose to provide ink-key data for use with printing presses.

`Printing Press`

> You can use this special device to calibrate the transfer from film to press. In general, you do not create calibration sets for a press—though this would be possible, but expensive, once you had created a calibrated output path to film or plate. A more common way of working is to

adjust the press to conform to one of the standard references such as SWOP (CGATS TR001) or a BVD-FOGRA standard and to use the corresponding calibration profile as supplied with the RIP.

You apply a calibration set for the press that you are using by choosing its name in the **Actual Press** pop-up menu in the Edit Page Setup dialog box. You can also adjust a job prepared for a different press; do this by choosing a supplied profile or measured calibration for that different press in the **Intended Press** pop-up menu, and making the normal choice for the press that you are using in **Actual Press**.

`Tone Curves`

This special device allows you to make another set of color adjustments in addition to the device calibration and press calibration. Typically, you might create a tone curve calibration by estimating the required change at one or two tonal values and then extrapolating and smoothing to obtain the other data values.

You apply a tone curve calibration set using the **Tone Curves** pop-up menu in the Edit Page Setup dialog box.

For the special devices, `Tone Curves` and `Printing Press`, the **Color Space** listing contains all the color spaces for which a profile exists.

To edit an existing calibration set, select it in the list and then click either **Edit from uncalibrated target** or **Edit from calibrated target**, as appropriate.

10.11.1 List headings and entries

The column headings are the various properties of a calibration set. The first column in the list is the name of the calibration set and the last column is the edited or unedited status of the calibration. Each of the remaining columns in the list corresponds to one of the warning criteria in the Edit Calibration dialog box.

The values in the columns for warning criteria show the intended values for use of each calibration set, as set in the Edit Calibration dialog box. The RIP will warn you if you select the calibration set for a page setup with conflicting values. You should create a calibration set for each combination of media and settings for resolution, dot shape, range of screen frequencies, exposure, and

negative / positive that you expect to use with each kind of device. Use narrow ranges if you want high accuracy.

In the columns for warning criteria, you may see the following entries:

`(Any)` Shows that any value is allowed, so the RIP will not warn if you select the calibration set. This corresponds to clearing the check box for the warning criterion in the Edit Calibration dialog box.

`(n/a)` *(not applicable)* Shows that the type of entry is not relevant to the device. For example: **Exp** (exposure) is `(n/a)` if the device does not support exposure control.

The individual columns are as follows, with the names used in the Edit Calibration dialog box following in parentheses.

Name The name of the calibration set.

Res (Resolution) The resolution setting.

Dot (Dot shape) The halftone screen dot shape or spot function.

Freq (Screen freq) The halftone screen frequency.

Exp (Exposure) The exposure setting, if software controllable by the RIP. For example, this option is not available for the None or Preview devices.

+ / - (Use for Pos & Neg) This tells you whether the calibration set can be used for both positive and negative output, as set by the state of the check box labeled **Use for Pos and Neg** in the Edit Calibration dialog box.

The possible entries are:

`Y` if you can use the calibration set for both

`N` if the calibration is for only one of positive or negative

Profile *(ColorPro only) or* **Press**

Entries in the **Profile** column are `n/a` except when ColorPro is enabled, when each entry shows which profile to associate with the calibration set. When `Printing Press` is selected in the **Device** pop-up menu, this column is labeled **Press**, but the behavior is the same. The default calibration set is determined by the selected profile.

Note: A profile is used in ColorPro options to define the color performance of a combination of output device, media, and colorants.

If you create calibration sets in the RIP without ColorPro and subsequently enable ColorPro, the RIP associates the `Linear` profile with the existing calibration sets.

Status The **Status** column tells you about the source and whether the current data for the given calibration set came from an uncalibrated target or a calibrated target.

The possible entries are:

`C` for data from a calibrated strip

`U` for data from an uncalibrated strip

`E` if you have edited the data since entering the Calibration Manager

`D` if you have viewed the default curve without editing it

See “Establishing a workflow” on page 388 for a discussion of why you might use different types of target.

`E` is an important entry in the **Status** column because it shows that you have uncommitted changes for that calibration set, which affects the valid commands and the values you see in the Edit Calibration dialog box.

If you select a calibration set with status E, you can only further edit the values in the same way, so only the edit button that you have already used on that set is enabled. If you edit the set, you see the entries you made in the previous edit.

When you click **OK** or **Select** in the Calibration Manager, the RIP commits the changes in all edited calibration sets. Once committed, the status reverts to C or U, both edit commands are enabled, and you see the *perfect* curve when you next view the calibration curve using **Edit from calibrated target**. (Perfect, in this context means linear only in some measurement systems.)

Once you have committed changes, the RIP can show you either the calibrated or the uncalibrated curve, for any future updating of the calibration.

Note: The same calibration set can have status U or C depending on the last target (and the corresponding edit command) used to update it.

10.11.2 Buttons

Most buttons operate on multiple calibration sets. Only the two edit buttons require just one selected calibration set.

Edit from uncalibrated target
: Click this button to enter the Edit Calibration dialog box for an uncalibrated target produced on an output device or printing press.

Edit from calibrated target
: Click this button to enter the Edit Calibration dialog box for a calibrated target produced on an output device or printing press.

New
: Click this button to create a new calibration set. You enter the Edit Calibration dialog box for an uncalibrated target with all **Warning criteria** boxes empty. At least, you must name the new calibration set and provide data values.

Copy Click this button to copy a calibration set. The RIP creates a new name for the copy by adding characters (for example, ~[1] or ~[2]) after the original name. If the name is longer than about 13 characters then you can see the added characters only in the **Name** field of the Edit Calibration dialog box, where you can also edit the name to be more meaningful.

Delete Click this button to delete the selected calibration set or sets. The RIP generates a warning if the selected calibration set is used in a page setup.

Note: You cannot delete a calibration set if you open the Calibration Manager from within the Edit Page Setup dialog box.

OK Confirms the changes you have made and exits the dialog box.

Select This button is available if you opened the Calibration Manager from the Edit Page Setup dialog box and if a calibration set is selected.

The **Select** button confirms the changes you have made and closes this dialog box. In addition, using the **Select** button displays the selected calibration set in the Edit Page Setup dialog box.

Cancel Closes the Calibration Manager, canceling all changes made since you displayed this dialog box.

10.12 Edit Calibration dialog box

Figure 10.5, page 385, shows the Edit Calibration dialog box.

There are various ways of entering this dialog box, and corresponding variations in its contents.

10.12.1 Entry methods and variations

There are three ways to enter the Edit Calibration dialog box, corresponding to buttons in the Calibration Manager:

- **New**
- **Edit from uncalibrated target**
- **Edit from calibrated target**

These ways of entry allow you to follow most working practices. The choice is yours.

When you use the **New** or **Edit from uncalibrated target** buttons, the RIP creates a calibration curve directly from the uncalibrated data values you enter.

When you use the **Edit from calibrated target** button, the RIP creates a calibration curve more indirectly. In some circumstances and with some devices, this indirect approach can lead to values that never settle to an error too small to measure; you may find that the residual errors are acceptable or you may prefer to use **Edit from uncalibrated target**.

One way of regarding the process for **Edit from calibrated target** is to say that the RIP uses the data values you enter from a calibrated target to detect imperfections in the existing calibration and adjusts the calibration to remove them. Typically, these imperfections and the corresponding adjustments are small (compared to those for uncalibrated targets) and may provide a better calibration curve than working from uncalibrated targets. Another advantage of working from a calibrated target is that it may allow the use of one fewer target—saving both time and media.

The RIP is supplied with default calibration curves for some output devices, each curve representing the linearized state of a typical device of the same kind. If you are using ColorPro, the default calibration set is determined by the profile. Without ColorPro, the RIP uses the `Linear` profile.

There are two special devices, shown in the Calibration Manager as `Tone Curves` and `Printing Press`. When you edit a calibration set for one of these devices, the Edit Calibration dialog box offers slightly different options (as described in Section 10.5.2 on page 390).

10.12.2 Checks in the Edit Calibration dialog box

There are various checks on the validity of the calibration curves as you change settings or enter data, and more as you exit the dialog box. The RIP displays an appropriate warning message if any of the checks suggest a problem.

10.12.3 Warning Criteria panel

It is important to choose a calibration set that is appropriate for the job you are processing. If you set the warning criteria for a calibration set, the RIP warns you if the settings in the page setup conflict with these criteria. In addition, when processing the job, the RIP warns you if the settings in the job conflict with those in the calibration set. By setting the **Abort job if calibration is on, and the selected cal set does not match job** option in the Page Setup Options dialog box, you can tell the RIP to abort any job that fails the criteria. See Section 4.23.7 on page 198 for details. Otherwise the RIP displays the warning messages in the RIP Monitorwindow.

Most of the controls in this panel are paired: a check box and a setting control. To make the calibration set apply to a particular value or limited range of values for the setting, select the corresponding box and then enter the value or values. If you do not select the box, the setting is not tested and the Calibration Manager shows (Any) in the column for that setting.

Note: If you create a calibration set from the Edit Page Setup dialog box, the RIP takes the default settings for the **Warning criteria** from the page setup you are editing.

The warning criteria are:

Profile *(not illustrated)*

This warning criterion is available only with ColorPro and appears only if your output device has more than one profile available. There is no check box associated with **Profile**: if present, the profile is always used as a criterion. The choice of profile determines the default calibration set.

Press *(not illustrated)*

This pop-up menu appears in the Edit Calibration dialog box only if you are editing the calibration for a printing press. There is no check box associated with **Press**: if present, the press profile is always used as a criterion. The choice of press profile determines the default calibration set. If ColorPro is not enabled, the RIP uses the `Linear` profile.

Resolution The resolution setting.

Dot shape The halftone screen dot shape or spot function.

Screen freq The halftone screen frequency. You can enter the lower and upper limits of a range of frequencies and choose the units in the accompanying pop-up menu.

Exposure The exposure setting, if software controllable by the RIP.

Use for Pos & Neg

Select this box to show that the calibration set is suitable for both positive and negative output. (This can apply only to monochrome devices.)

Also select the **Negative media** box if you are measuring from negative output, and use the **Measurements as** pop-up menu to show whether you are measuring with a positive or negative reading densitometer.

10.12.4 Other controls

Name The name of the calibration set. If you alter the name shown here you are renaming the set, not creating a new set.

This box is empty if you enter this dialog box by clicking the **New** button in the Calibration Manager. You must enter a name before leaving this dialog box.

Channel

This pop-up menu contains the names of the channels defined in the calibration set. Depending on the device, there may be one or several channels. A monochrome device has a single channel, while a color device has several channels labeled with the names of the colors. For example: `Cyan`, `Magenta`, and `Yellow` are possible channels for a 3-color device. If the output device can support additional colorants, you can add a channel for a spot color. The channel `(Other colors in job)` allows you to specify a calibration curve for any spot colors that do not have a separate calibration curve. Note that although an imagesetter is not a multi-color device, you can create a separate calibration curve for each color, to take account of the different screen angles specified in the separations style.

You must specify a separate calibration curve for each process color channel to produce a valid calibration set. The RIP reminds you to view the data for each channel to assess if it needs editing, as described in "Exiting the Edit Calibration dialog box" on page 419. Note that you can also **Copy** the data from one channel to another channel.

The RIP does not allow you to change to another channel if the calibration curve for the current channel is unreasonable. One example of an unreasonable curve is a non-monotonic one that rises but then falls before rising again. In such a case, the RIP warns you and prompts you to correct the curve before you can change to another channel.

Add

To add a channel for a spot color, click the **Add** button. In the Add Channel dialog box, select the name of the spot color from the pop-up menu and click the **OK** button. The list of spot colors contains all the spot colors named in the separations styles for the selected device and color space.

Note that in the special case of the `Tone Curves` and `Printing Press` devices, the list includes all the spot colors named in separations styles for any device in the selected color space. This is because tone curve and press calibration can be used with any page setup.

Copy

If the data for one channel is similar to another channel, you can copy the data and then edit it, rather than having to enter it again. For example, to copy the data from the Cyan channel to the Magenta channel, first select the Magenta **Channel** and click the **Copy** button. Then, in the Copy Channel Data dialog box, select the Cyan channel from the pop-up menu and click the **OK** button.

For some devices, for example with an imagesetter, you might feel that the calibration of the black channel is also adequate for the color channels. In this case, use the **Copy** command to copy the black channel data to the other channels.

Delete

You can delete any spot color channel from the **Channel** pop-up menu by selecting the spot color channel and clicking the **Delete** button. If you have not defined any spot color channels, the **Delete** button is not available.

Measurements as

Use this pop-up menu to declare what kind of measurements you are entering in the data boxes. The entries available in this menu can vary with the type of output device. Two examples are `Status T`, a standard measure of absolute density, and `% Dot`, the area coverage of halftone output.

Note that if you choose to edit a different **Profile** which uses an alternative measurement system, a `Measurement system ...not found warning` is displayed and the correct system for the newly chosen profile is automatically selected in this menu.

Max density *(not illustrated)*

This control allows for conversion between percent dot and density. It appears only for the `Printing Press` device and for ColorPro profiles that require it to appear.

10.12.5 Values

You can enter values in any form offered to you in the pop-up menu labeled **Measurements as**. Examples are:

- Percent dot (0 through 100%)
- Dot Gain (relative values expressed in ± values from a perfect transfer curve)
- Status-T Density
- Visual or ISO Visual (which is the same as the Visual channel of Status-T)
- L* (from CIE L*A*B*)

10.12.6 Test strips and data boxes for patches

Each output device can have its own pattern of test strip and there can be varying numbers of patches on test strips for different devices. If the target uses fewer patches than the maximum (36) then the remaining data boxes appear empty and unlabeled.

You can exit this dialog box only when all labeled boxes have entries. You can provide entries by typing, by using **Extrapolate**, or by using **Import** and a file of data values.

10.12.7 Controls

Negative media Select the **Negative media** check box to show that you are measuring data from negative output media. Leave it clear when you are using positive media.

Force solid colors

This check box is available only when you are using halftone devices. When you select this box, any color in a job that uses the maximum density of any channel is represented by the maximum amount of that colorant available on the output device: this guarantees a solid color that is the maximum deliverable by the output device, rather than a lower density color (achieved by screening) that calibration has established as 100%.

The default setting of this option is selected and should be left for work on most presses—this will ensure that colors defined as solid in the incoming PostScript file will be imaged as solid. For Gravure work this option should be unchecked.

This option does not apply to calibration test strips, only jobs.

For example, this is a desirable setting where you wish to avoid screening black text, but using it means you do not have an exact colorimetric match for the color when using ColorPro. See also the *Harlequin ColorPro User's Guide*.

Smooth

This button smooths the values near the ends of a curve: typically, to approximate a smooth curve where the limited resolution of a measuring device may have truncated similar values to be the same.

Extrapolate

This button is enabled when you are calibrating for a printing press or when the output device supports extrapolation. There also needs to be at least one empty data value.

You can use **Clear** to empty all data values, enter a limited number of values, and then press **Extrapolate** to have the RIP calculate the remaining values. A typical

source of values is a manufacturer's data sheet, for example, giving press gain in the form: *a gain of 15% at 50%*.

In rare cases, extrapolation may not be able to produce a reasonable curve: the RIP displays an error message to tell you if this has happened. (One example of an unreasonable curve is a non-monotonic one that rises but then falls before rising again.)

Clear Click this button to clear all the boxes. This is intended as a preliminary to entering data in a small number of boxes and using the **Extrapolate** button to calculate values for the other boxes.

Reset **Reset** deletes all entered data for the calibration set and displays the default curves for the device (and profile, if ColorPro is enabled). For a multi-channel device, it resets all channels; not just the channel whose curve is displayed.

Import To import the data from a file rather than typing numbers into the boxes, click the **Import** button. The RIP displays the Import Measurements dialog box, shown in Figure 10.6.

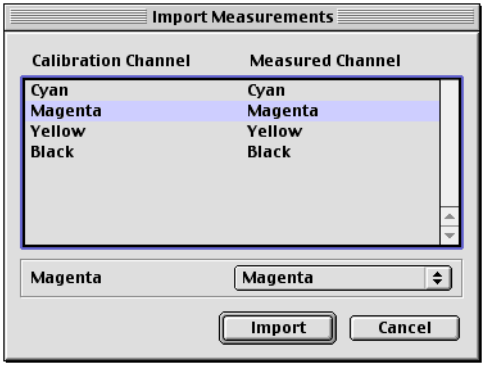


Figure 10.6 Import Measurements dialog box

Note: The data in the file is provided in the correct format by a separate utility program, Genlin, which supports the use of various automated densitometers. See Appendix C, "Using Genlin" on page 503 for details.The import file contains measured data for some or all of the channels in the calibration set. For each calibration channel, you can choose to import the measured data for that channel, to import data that was measured for a different channel, or to leave the current data for the calibration channel unchanged. By default, the RIP uses the measured data for a channel, where available. If there is no measured data for a channel, the RIP defaults to the `(No Change)` option.

The **Calibration Channel** column contains the names of all the process and spot color channels defined in the calibration set, including the `(Other colors in job)` channel, if appropriate. When you select the **Channel** pop-up menu in the Edit Calibration dialog box, you see the same list of defined channels. (You can define a spot color channel using the **Add** button in the Edit Calibration dialog box: see page 413 for details.)

The pop-up menu under the **Measured Channel** column contains the names of all the measured channels in the import file, together with the `(No Change)` option.

To change the setting for a particular calibration channel, select the corresponding row and then select the name of a measured channel or `(No Change)` from the available list. For example, select the `Yellow` row and then select `Cyan` from the pop-up menu to import the data measured for the Cyan channel to the Yellow calibration channel. A more realistic example might be to select an available measured channel, perhaps `Default`, for a `Black` or `Gray` calibration channel when the measurement file does not identify the data in the way expected by the RIP.

Note: The RIP may detect a mismatch between the expected device, profile or measurement system and display a warning dialog box. This protects you from importing incorrect data.

10.12.8 Exiting the Edit Calibration dialog box

You must specify a separate and valid calibration curve for each process color channel to produce a calibration set, unless you want to accept the default curve. The RIP carries out checks on the data before it saves the calibration set.

If you exit the Edit Calibration dialog box without editing any calibration data, the RIP closes the dialog box and saves the calibration set with a status of `D`. This shows that you have viewed the default curve without editing it.

If you have edited the data for one of the process color channels, but not all of them, the RIP warns you and asks for confirmation that you want to exit without editing the other channels.

In this context, "editing the data" for a channel means at least viewing the data to assess if it needs editing. The RIP keeps a record of which process color channels you have edited and queries you if you have not edited all of them.

For example, if you edit only the Cyan channel of a 4-color device, the RIP will query you about the Magenta, Yellow, and Black channels. The following message is typical:

```
You haven't viewed the following channels: Magenta, Yellow, Black.
Finish editing anyway?
```

The RIP does not allow you to save an unreasonable curve. One example of an unreasonable curve is a non-monotonic one that rises but then falls before rising again. If you try to save an unreasonable curve, the RIP warns you and prompts you to correct the curve before you can save it.

11

Color Separation

This chapter describes some basic concepts of color reproduction and the related parts of the Harlequin RIP.

The concept of color separation is no longer restricted to producing separated output. When processing any job, the RIP creates a separation for each process colorant and also, where appropriate, for spot colorants. The output format determines whether the separations are printed together as a composite, or separated. By configuring these separations you can control the printing of individual colorants in the job. Although there is only one separation in the monochrome color space, the RIP provides the same options for configuring that separation.

Separations information is saved together with screening information in a *separations style*, which can be used in several page setups. A separations style is defined for a specific device, color space, and output format. Selecting a separations style in the Edit Page Setup dialog box determines the color space of the page setup.

These are the related parts of the Harlequin RIP:

- The Separations Manager and Edit Style dialog box. See Section 11.5 on page 434 for details of the choices you make for all separations. (See Chapter 5, "Screening" for details of the screening options for halftone separations.)

- The Color Setup dialog box. See Section 11.8 on page 450. This dialog box contains the controls for black generation and undercolor removal, trapping, and overprinting.
- Use of the Output Controller to view superimposed color separations. See Section 11.11 on page 466. The Output Controller is available in either of the multiple modes.

This chapter describes how you can define separations styles, while Chapter 4, "Configuring Output Formats", describes how you can choose different separations styles when producing output.

11.1 Introduction

To produce a color image, many reproduction systems take advantage of the fact that there are small sets of colors that, when mixed in the correct proportions, can produce any of a very wide range of other colors. For example, combinations of red, green, and blue inks (commonly known as RGB), or cyan, magenta, and yellow inks (CMY), can between them produce thousands of different hues.

Color printing more commonly uses CMY colors, with the addition of a black ink to account for imperfections in the printing process. This manual uses the term CMYK for the system of color representation using these four inks (Cyan, Magenta, Yellow, and blacK). These inks are the commonly used *process colors*. There are several other terms in common use, some terms using B for Black or referring to the order of printing each ink by reordering the letters: YMCK, YMCB, and KCMY are typical.

Black ink is used for several practical, economic, and quality reasons:

- Black appears very often: for example, in text.
- Black ink is cheaper than colored inks.
- Mixing CMY inks produces an impure black, probably tinged with brown, and can result in objectionable colored fringes on small objects such as characters in body text. Additionally, one application of black ink replaces three applications of colored inks so drying time can be reduced.

- Black can be used to extend the range of colors and tints available from mixing CMY inks.

There are ways to improve reproduction quality or economy beyond the levels possible with CMYK process inks. There are two general approaches: to vary the number of process inks (*HiFi* or *N-color* printing), or to add *spot colors*. Each approach has its own advantages.

11.1.1 Alternative process color systems

N-color printing uses a different number of process colors: fewer for economy in simple jobs such as forms printing or more for high quality. For high-quality printing, or *HiFi* color, at least two distinct types of color schemes are growing in popularity: for convenience in this discussion we shall call them *distinct colorant* and *photo-ink*.

Distinct colorant printing uses a combination of different process colors. For example, in the PANTONE Hexachrome Color Selector system there are six inks: cyan, magenta, yellow, black, orange, and green. (Other schemes of six or seven distinct colors are possible but this system is well known.) These colors are chosen as a set to provide a wider gamut than provided by colorants in the established CMY or CMYK schemes so, for example, the cyan in a six-color system is unlikely to be the same as the cyan in a typical CMYK system. To avoid confusion a different naming scheme is needed. There is not a single fixed set of names: HexC or HexCyan are equally valid names for the cyan ink and may be used by graphics applications creating jobs.

Photo-ink technologies use a different approach. There are different densities (light and dark versions) of one or more colorants. A capable system is then able to use the light ink in highlight areas and the dark ink where more colorant is required. A typical set of colors is light cyan, dark cyan, light magenta, dark magenta, yellow, and black. As in distinct colorant systems, these are not the same inks as used in the CMYK system and it is important to distinguish between the two systems. Various naming schemes are possible: a possible example is PhotoCyan Light, PhotoCyan, PhotoMagenta Light, PhotoMagenta, PhotoYellow, and PhotoBlack.

The Harlequin RIP provides facilities for screening and calibrating both of these color systems, but the actual availability for use of a distinct colorant or photo-ink color space depends upon there being an installed output plugin

using the new software facilities. Also, some configuration of the files in which the RIP stores colorant databases may be needed before first use. For example, the Harlequin RIP allows for jobs to use any of the different color naming schemes discussed for distinct colorant and photo-ink systems and to link these to the internal naming scheme used by the RIP. Each new naming scheme requires some configuration.

11.1.2 Spot colors

Spot colors are used in a job when a particular color is used very heavily or must have a better quality than is available by mixing the process colors. Typical uses of spot color include colored text, company logos, and colors that are outside the range available from mixing process colors. Spot colors may also be used to define effects other than coloring: for example, to place varnishes and glues.

11.1.2.1 The PANTONE MATCHING SYSTEM

The Harlequin RIP is able to make use of the latest PANTONE MATCHING SYSTEM. Previously, Pantone colors were identified as CV (coated) and CVU (uncoated). For example `PANTONE 533 CV` and `PANTONE 533 CVU`.

With the new system, colors are identified as M (matte), C (coated) and U (uncoated). For example, `PANTONE 533 M`, `PANTONE 533 C`, and `PANTONE 533 U`.

Both the new and previous set of names will produce correctly on the output device.

All the Pantone Databases can be found in `SW\NamedColor`.

To use the PANTONE MATCHING SYSTEM the color names must match exactly the names used in the job. For information on how to include color separations see Section 11.7.1, “Producing separations”.

The Pantone Process database has been released in the Harlequin RIP v5.5r3

As previously stated, all the Pantone Databases are in `SW\NamedColor`. The new `PantoneProcess` Database is found in the `SW\NamedColor\Examples` folder.

To make this database work, it must be referenced in one of the files in `SW\NamedColorOrder`. You do this by editing `Intercept`, `Recombine` and `Roam`.

`PantoneProcess` should be put before `PantoneU` if all Pantone colors should be produced by their CMYK equivalents.

Putting it at the end (that is, after `PantoneMatte`) will mean only the new PC Pantone colors will be found. (that is, `PantoneU` and `PantoneV` colors will still be converted to XYZ).

11.1.3 Types of color jobs

There are two common types of color jobs:

- All the color information is in one job. This is a full-color job, also known as a color composite.
- The color information has been separated into a page for each color ink. This is a *preseparated job*. These pages may be parts of one job or separate jobs.

Composite jobs offer the greatest flexibility in handling jobs and targeting them to different output devices, but many workflows are built around preseparated jobs. The RIP can recombine many preseparated jobs, provided that the separations are supplied as one job. (Section 11.4.1 on page 433 and Section 11.4.2 describe the details of using composite and preseparated jobs with the RIP.)

11.1.4 Harlequin RIP

This chapter describes how you can produce output from documents for use in CMYK color printing. You can also produce output for other color systems, such as RGB and N-color, and output for jobs that include spot colors. The Harlequin RIP accepts either full-color jobs or preseparated jobs as input, and outputs them correctly.

The Harlequin RIP also provides some extensions to the PostScript-language specification: for example, the ability to recognize spot colors in documents defined using the PostScript Level 1 language.

11.1.5 Harlequin ColorPro

Harlequin ColorPro extends the color handling capabilities of the RIP. For example, you can use ColorPro to intercept CMYK color definitions and convert them to device-independent color using input profiles. The extra facilities and changes of procedure associated with ColorPro are described in the separate manual *Harlequin ColorPro User's Guide*.

11.2 What color separations are

Color printing using this color-mixing method is done using *color separations*. These are sets of single-color images that yield a full-color image when combined appropriately. Figure 11.1 shows how four single-color images can be combined to produce an image in different colors. In this grayscale figure, different shades of gray represent the various colors.

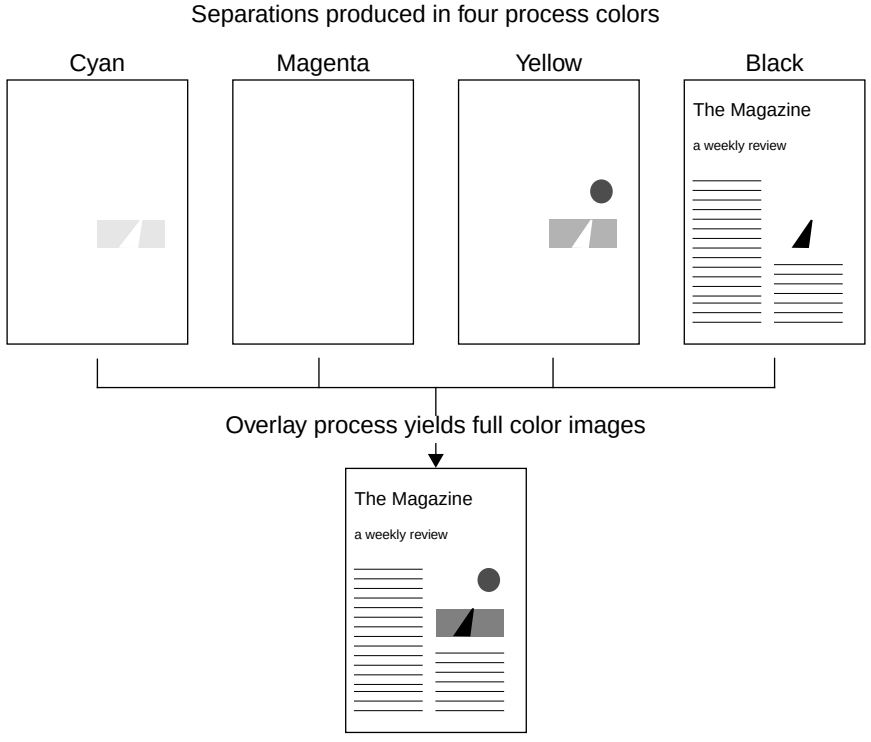


Figure 11.1 How separations can form a color image

The image in the figure shows the cover page of a fictional magazine. It is mostly black, but has a small color illustration on the right that consists of some land (in green), over which there is a road (in pure black), and in the sky (not colored) the sun (in pure yellow) is shining.

Color images are not produced from separations by mixing inks before application to the page. Instead, the illusion of a full-color image is produced by seeing different proportions of the four inks laid together on the page. Each separation adds one color component to the image—cyan, magenta, yellow, and black in turn—and, when they are overlaid correctly, they form a full-color image.

A color separation is, strictly speaking, a monochrome (that is, one color) image. It is called a *color separation* because it is the result of separating one color from the others in the color system. For example, the yellow separation in CMYK is a version of the image that shows only the yellow part of it, separated from the cyan, magenta, and black. (You can control how colors will be separated from the others in an image.)

Seen in isolation, a single separation may not look much like the full-color image of which it will form a part but it is usually possible to identify some features of the final image. In Figure 11.1, the yellow separation shows the sun, which is pure yellow. It also shows a small amount of yellow in the ground part of the image, which will combine with the cyan separation to form the grass color. However, it does not contribute to the road or the text, and so it is empty in those places.

11.2.1 Knockouts and overprinting

Suppose we have a very simple image that is a pure magenta background with a pure yellow square in the middle. The separations produced will be those in Figure 11.4.

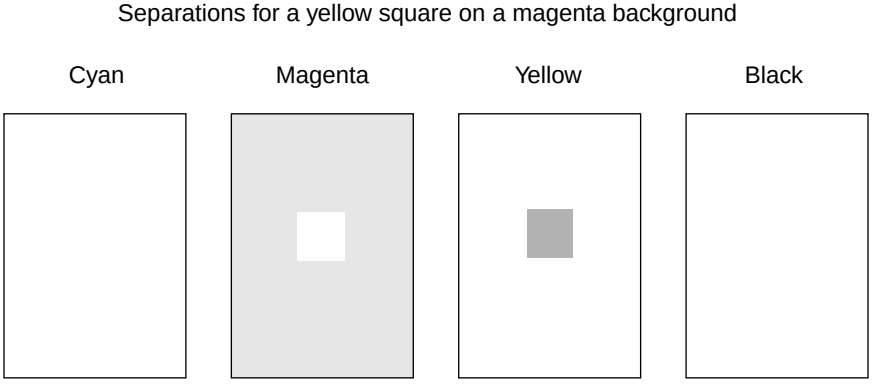


Figure 11.2 Color separations for a simple image, with knockouts

Since the yellow and magenta inks can portray yellow and magenta quite adequately on their own, the cyan and black separations are empty.

The yellow separation shows a square in the middle and nothing else. The square signifies the presence of yellow in the image at that point. The magenta separation shows a white square on a magenta background. So, magenta will be printed in every part of the image except for that square.

Because magenta will not be printed in the white square, only yellow will appear there when the separations are put together. This is important, since if magenta was printed there too, it would mix with the yellow, and produce a square that was not pure yellow, but red. Equally, no other inks will overlap the magenta background, because no separations other than the magenta one contribute any color to that region.

An area of a separation that is made empty so that it does not interfere with a graphic object represented by a color or colors in other separations is called a *knockout*. This is because the colored area has been *knocked out* of the separation.

One problem with using knockouts is that if the separations are not overlaid accurately enough, there may be a white gap at the edge, as shown in Figure 11.3. This effect is the product of *misregistering* the separations, that is, misaligning them when they are combined. Nevertheless, in cases where printing one ink on top of another would produce the wrong color, producing

separations with knockouts is essential. Generally, graphic and page design applications produce knockouts automatically.

Inaccuracies caused by misregistered knockouts can be overcome by using special printing effect such as *trapping*. The RIP provides some support for trapping. See “Trapping features” on page 464.

Figure 11.3 Misregistered separations with white gaps

Suppose we have another simple image that is a pure magenta background with a black square in the middle. Figure 11.4 shows the separations that can be produced.

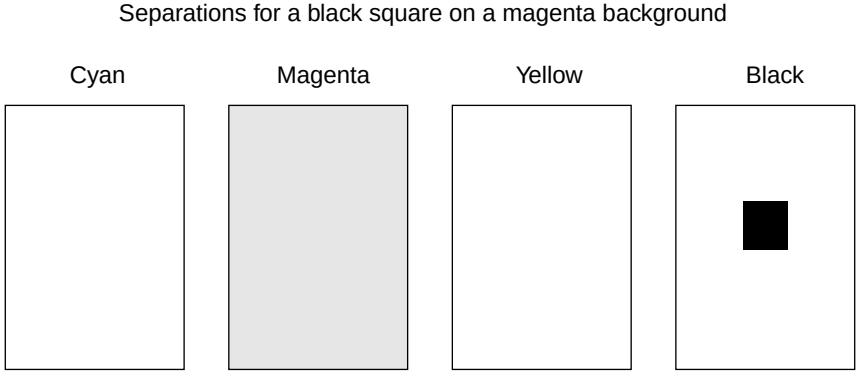


Figure 11.4 Color separations for a simple image, with black overprinting

In this case, we do not need to make a knockout on the magenta separation, because the black ink should be strong enough to overcome the influence of the magenta ink beneath it. So we may choose not to let the black separation cause a knockout in the magenta separation. This effect is called *overprinting*, and is the opposite of a knockout. Overprinting eliminates the risk of finding gaps in the final output, but cannot be used unless the overprinted ink is strong enough to overcome the effects of the ink or inks beneath it. When overprinting is not possible, trapping remains a possibility.

11.3 Producing color images from separations

In the RIP, depending on the output format, you can print separations together as a composite page, colored separations, or each separation as a monochrome page.

If you print a set of monochrome separations for use in the printing process, these separations can be put together to form a color image. The separations are carefully placed one on top of the other until all the color details can be seen. How is this achieved?

Typically, color pictures do not consist only of areas drawn in full-intensity primary colors. Most of the picture is usually be in various shades and tints. Most printing presses require screened halftones, so these varying intensities are achieved by using halftone dots. Each separation, therefore, is usually composed of a pattern of halftone dots. (See Chapter 5, “Screening”, for details of halftoning.)

In halftoning strategies, continuous tone gray or colored images are imitated by combining dots of different sizes and colors. They are combined in such a way that, to the human eye, they mix, and the observer sees the intended color image.

To ensure that the colors combine correctly, the positions of the dots on each separation are calculated carefully. The grids, or halftone screens, for each separation are aligned at different angles, to avoid *moiré* patterns.

Once each separation has been produced, the final image can be constructed by printing the separations directly on top of each other. The intermediate stages are *progressive proofs*. In the CMYK model, this is usually done by printing yellow first, then magenta, cyan, and finally black. Figure 11.5 and the fol-

lowing figures show the stages involved when printing color in this way for the example image in Figure 11.1, page 426.

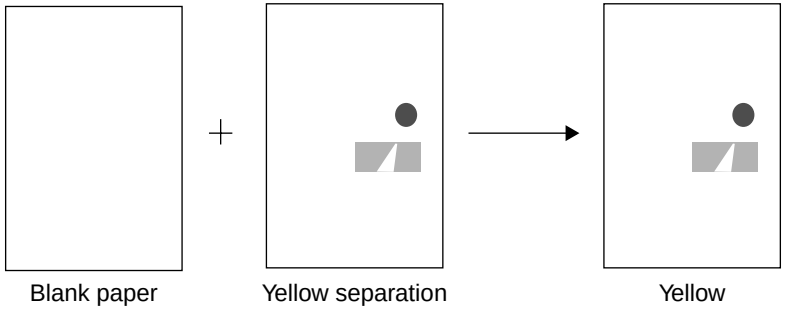


Figure 11.5 Yellow separation

Figure 11.5 shows how yellow ink for the yellow separation is printed on blank paper. You can also preview separation printing on screen in the RIP. See “Roaming separations” on page 466.

Next, the magenta ink for the magenta separation would be printed on the paper, but since the separation is empty for this image, nothing is printed.

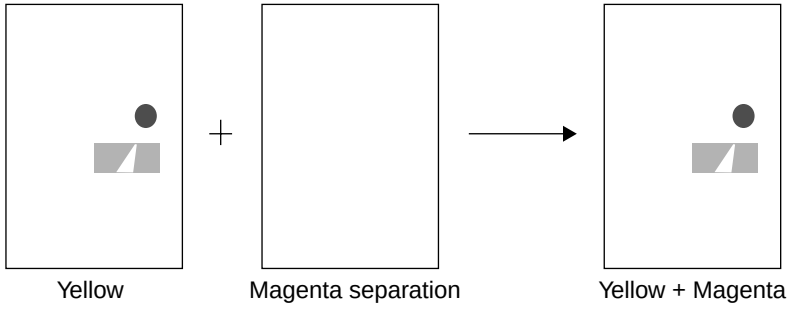


Figure 11.6 Yellow and (empty) Magenta separations

Next, the cyan ink for the cyan separation is printed. To the eye, the pattern of cyan and yellow dots in the area of land will appear green as simulated in Figure 11.7.

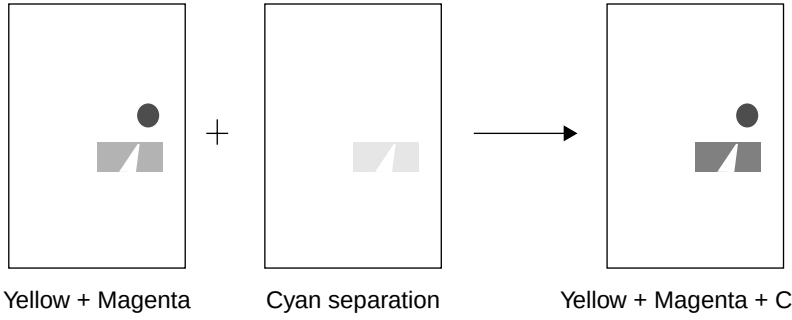


Figure 11.7 Yellow, Magenta, and Cyan separations

Finally, the black ink for the black (K) separation is printed. All of the separations have been combined, producing a full-color image as simulated in Figure 11.8.

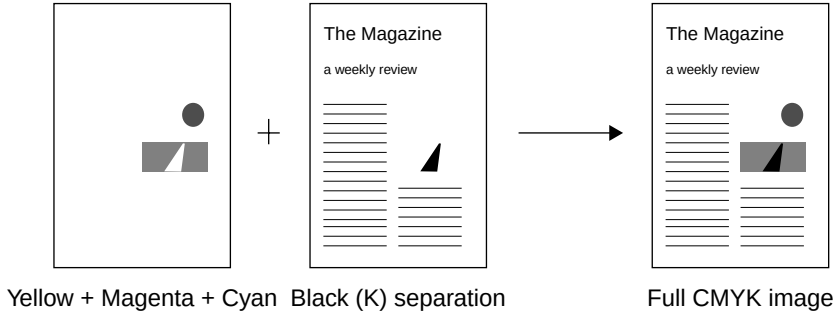


Figure 11.8 Yellow, Magenta, Cyan, and Black separations

11.4 How color separations are produced

Each job may specify color images in one or more different color spaces, for example: CMYK, RGB (red, green, and blue), HSB (hue, saturation, brightness), or an N-color space. No matter how a job is specified, the RIP separates that job into *one* output format, to suit the output device. Again, in this discussion we will concentrate on CMYK separations as an example.

11.4.1 Color PostScript-language jobs

Composite color jobs are not described as a series of separations. Instead, each object on the page is described just once, in full color.

Importantly, the PostScript-language method of describing color is *device independent*. That is, no matter what color space is used to describe an image, it can be rendered on any properly color-calibrated output device that your RIP supports. The same color job can thus be used to produce, for example, full-color output on an RGB color printer, or a set of monochrome separations ready to be used in the printing process. Some devices, typically desktop printers and proofing systems, can accept continuous tone input.

Note: If you have ColorPro available, you can apply it to CMYK separations as well as to color composite CMYK jobs. The separations must be suitable for use with the **Recombine preseparated jobs** option described on page 445.

The RIP can take full-color jobs as input, and interpret them once to produce separation information for each color in the space. In CMYK, this creates four monochrome output pages, each corresponding to a different color separation. When the full-color image is to be produced, the colored parts of a separation show where inks should be applied, and the white parts where not. Alternatively, the RIP can print the separations together as a composite.

11.4.2 Preseparated jobs

Having the RIP produce separations from composite color jobs is not the only means of producing separations. The job could be separated into one or more PostScript-language documents before it reaches the RIP. This might be done by the application program in which the job was composed, or by a special separator program that took the output of the composition program and produced PostScript-language separations from it.

However, these methods are not optimal. If you preseparate the job, you commit yourself to printing the job on a device that can recombine the separations it produced: the documents become *device dependent*. A process that commits a job to a particular device is not desirable, because you may need to output your job on a number of different devices. The RIP can recombine certain classes of preseparated jobs: see the description of the **Recombine preseparated jobs** option on page 445 for details.

There some circumstances where you *must* use recombination with preseparated jobs in order to use features of the RIP, and some of these circumstances apply even when you wish to produce separations. These features are:

- Output to a composite proofing (or final output) device.
- Color management, using ColorPro.
- Trapping, with the in-built options in the RIP.
- Output to progressive separations.
- Output of separations in a different order.

All these features require the RIP to have access to the complete color of all objects on a page. To ensure that this is possible for preseparated jobs, select **Recombine preseparated jobs**. Alternatively, where other settings in the page setup prohibit recombination, select **Reject preseparated jobs**.

Note: Both colored separations and progressive separations require the output color space to match that of the separations. For example, it is not possible to produce colored separations or progressive separations from a job preseparated to CMYK if the output device uses the PhotoInk color space.

The RIPs separation facilities allow you to preserve device independence in your jobs right up until you wish to interpret it for output on a particular device. However, you can present device-dependent, preseparated jobs to the RIP if you wish, and it will process and output them correctly.

11.5 Creating and managing separations

Separations information is saved together with screening information in a separations style, which can be used in several page setups. A separations style is defined for a specific device, color space, and output format. Selecting a separations style in the Edit Page Setup dialog box determines the color space of the page setup.

Separations styles are created and managed in the Separations Manager.

11.6 Separations Manager dialog box

The Separations Manager appears when you click the **Separations Manager** button in the Edit Page Setup dialog box, or choose the **Color > Separations Manager** command.

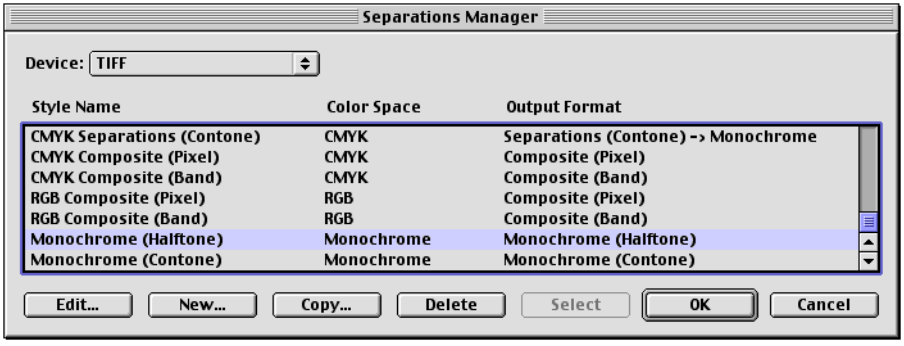


Figure 11.9 Separations Manager dialog box

The Separations Manager displays a list of all existing separations styles for the current device, showing the name of each separations style, the corresponding color space, and the output format.

To display the list of separations styles for a different device, select a device name from the **Device** pop-up menu. When you use a device for the first time, the RIP generates a set of separations styles for that device. Some devices can support simple styles only. Others, like TIFF, can produce many different styles, so the names of the styles are chosen to avoid ambiguity.

You can edit these separations styles to suit your installation or create new ones.

11.6.1 Controls and actions

The controls below the list allow you to create separations styles, and to edit, copy, or delete existing separations styles.

Edit — Select a separations style and click this button to edit it in the Edit Style dialog box. A shortcut is to double-click a separations style.

Note: To rename a separations style, copy it and save the copy with the desired name, before deleting the original.

New Click this button to create a new separations style. The New Style dialog box appears, as described in Section 11.6.2.

Once you have set the color space and output format, you cannot change them for the named separations style.

Copy Select a separations style and click this button to edit a copy. The New Style dialog box appears, as described in Section 11.6.2.

Delete Select one or more separations styles and click this button to delete them together. You cannot delete a separations style if it is used in a page setup.

You cannot delete the only separations style in a list.

Select This button is available if you opened the Separations Manager from the Edit Page Setup dialog box and a separations style is selected.

The **Select** button confirms the changes you have made and exits the dialog box. In addition, the **Select** button displays the selected separations style in the Edit Page Setup dialog box.

You can also select separations styles and reorder them by dragging them to new positions in the list. The order in the Separations Manager is the order of appearance in menus where you choose a separations style.

11.6.2 New Style dialog box

The New Style dialog box appears when you click the **New** or **Copy** button in the Separations Manager.

Note: If you clicked **Copy** to display this dialog box, you can change only the style name: this ensures that the new style is a true copy of the original. Once you have named the copy and clicked **Create**, you can modify individual settings in the Edit Style dialog box.

Figure 11.10 New Style dialog box

Style name Type in a name for the separations style. The style name must be unique and can be up to 30 characters long.

Color space Select the color space from the pop-up menu. You can select any color space known by the RIP, not just the color space of the target device. Monochrome, RGB, and CMYK are always available. If you have installed an N-color device, you can also use its color space, even if you are not printing to that N-color device. This choice determines the process colorants specified in the separations style. The output format specifies how the colorants will be printed on the output device.

Output format Once you have selected the color space, select an output format from the pop-up menu. This specifies how to generate the output on the target device. The available options depend on the selected output device and the setting for **Color space**. For example, with a typical CMYK device operating in its own color space, you can generate output as monochrome separations, as colored

separations (either single or progressive proofs), or as a composite. For an RGB output device, you can convert CMYK or N-color separations to RGB output, and so on. When an arrow appears in the output format name, it indicates that the color space does not match that of the output device.

Note: Once you have set the color space and output format, you cannot change them for the named separations style.

Click the **Create** button to open the Edit Style dialog box, described in Section 11.7 on page 439. Click **Cancel** to discard your changes immediately.

11.6.3 Selecting several separations styles

You can select multiple separations styles when you want to delete or reorder them. Use the following keys:

To select a block of separations styles that appear together in the list, select the first style in the block, then, while holding down the Shift key, select the last style in the block.

To select several separations styles, regardless of whether they form a continuous range, hold down the Command key while selecting the styles you wish to delete.

11.6.4 Closing the Separations Manager

You must close the Separations Manager before you can use any tool bar buttons or menu options in the RIP.

Click **OK** to confirm all the changes you have make in the Separations Manager and Edit Style dialog boxes. The **OK** button saves the changes you have made and closes the Separations Manager. If you opened the Separations Manager from the Edit Page Setup dialog box, you can also save the changes by clicking the **Select** button. In addition to saving the changes, the **Select** but-

ton displays the selected style in the Edit Page Setup dialog box. Click **Cancel** to discard all changes.

Note: If you open the Separations Manager from the Edit Page Setup dialog box, changes that you make in the Separations Manager are independent of the Edit Page Setup dialog box. For example, if you create a separations style, and close the Edit Style dialog box with **OK**, and the Separations Manager with **OK** or **Select**, the new style will remain even if you click **Cancel** in the Edit Page Setup dialog box.

11.7 Edit Style dialog box

The Edit Style dialog box appears when you create or edit a separations style in the Separations Manager. It contains the options related to separations and, where appropriate, to screening. There are two forms of the dialog box:

- If the output format of the separations style supports screening controlled by the RIP, the Edit Style dialog box contains options that allow you to set up defaults and override the screening parameters requested in a job. See Chapter 5, "Screening" for a description of these screening options: try starting with Figure 5.2, page 213.
- Otherwise, a more compact dialog box displays only the options for separations, as shown in Figure 11.11. This form of the dialog box suits contone output and also output to devices and processes that do their own screening.

The remainder of this section describes the separations options appearing in both forms of the dialog box.

Note: There are also controls for black generation for CMYK output and overprinting in the Color Setup dialog box, accessed from the **Color Setup Manager** or the Separations, Screening, and Color section of the Edit Page Setup dialog box. (See Section 11.8 on page 450.) Also, trapping options are available from the Separations, Screening, and Color section of the Edit Page Setup dialog box. (See Section 11.10 on page 464).

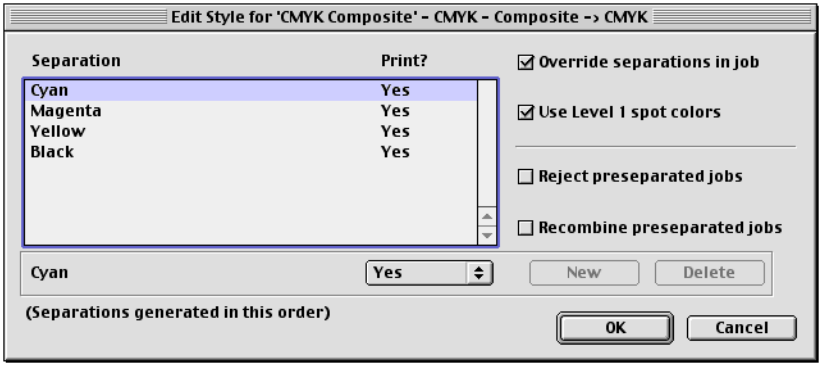


Figure 11.11 Edit Style dialog box

This dialog box contains a list showing the separations that the RIP can produce. There are initially separations for the process colors in the selected color space. In Figure 11.11 there are separations for the four process colors in the CMYK color space.

If the chosen output format supports additional colorants, you can control the printing of spot color separations using the (`Other colors in job`) entry, or you can add a separation for a specific spot color.

The order in the list defines the order of production of separations on output. If the output device can generate separations in a different order, you can move a selected color up and down the list by selecting it and dragging to the new position.

You can rename or delete spot color separations. You *cannot* delete the standard process color separations from the list, nor can you change their names. You may, however, ask the RIP not to produce a certain separation.

For particular jobs, you may want to vary the settings in the interests of efficiency or to ensure compatibility with PostScript-language code that uses Level 1 operators. For example, the default settings produce separations for all process colors, so you may want to turn off some process colors if a job is mainly defined in spot colors. Also for example, if you need to reprint just a single separation (and it is not saved in the Output Controller), you can turn off all the other separations.

The **Print** option in the Edit Style dialog box determines which separations are produced. The RIP produces all those separations marked as `Yes` and the non-blank separations marked as `Not Blank`.

Note: If you are printing a preseparated job, and you wish to *not* produce some separations, select **Recombine preseparated jobs**, even if you then wish the RIP to produce output separations. The RIP produces all separations of a preseparated job except when recombining.

If you are producing screened separations, you can control the screening of process and spot colors by using the screening options in the Edit Style dialog box. See Chapter 5, "Screening" for a description of these options.

Note: The separations shown in this dialog box always take effect for jobs that do not specify their own separations. If the job attempts to specify separations, you must select the **Override separations in job** check box if you want to produce the separations shown here.

11.7.1 Producing separations

The boxes below the list of separations allow you to control the printing of process color separations and change the ink type. If the chosen output format supports additional colorants, you can also control the printing of spot color separations. Any spot color not explicitly listed is controlled by the (`Other colors in job`) settings. With the default settings, if a job calls for spot colors not named in the list of separations, the RIP converts those spot colors to the appropriate combination of process colors.

To change the settings for an existing colorant, select the colorant from the list and edit the values in the boxes below.

Note: If the output format of the separations style supports screening, you can also change the screen angle of the process color or spot color separation. See Section 5.5.1, "Changing angles for separations" for details.

Separation The name of the separation. To rename a spot color separation, type the new name into the text box. You cannot rename process color separations.

Warning: The name you enter for the spot color must match the one used in the job in every respect: upper and lower case, use of embedded space characters and any trailing `CV` or `CU` suffixes. For example: a typical Pantone specification is `PANTONE 386 CV` but applications may report this in different ways.

Print

If this option is set to `Yes`, a page will be produced for the separation, even if the separation is blank. If this option is set to `No`, the page will be omitted, although any effects it might have on the others are still calculated. You might use this feature to suppress process color separation for a job using spot colors only. If the option is set to `Not Blank`, the RIP will produce a page for that separation as long as the separation is not blank.

For example, to produce only the process colors and convert all colors defined as spot colors in the job to process colors, set each process color to `Yes` and set `(Other colors in job)` to `No`. These are the default settings.

To produce a separation for every spot color requested in the job and for each of the process colors, set each process color to `Yes` and set `(Other colors in job)` to `Yes`. Then any calls for unlisted spot colors in a particular job mean that the RIP produces the required separations automatically for that job.

If you want to produce a separation for a specific spot color and to convert all other spot colors which may be included in the job to process colors, set the specific spot color to `Yes` and set `(Other colors in job)` to `No`.

Of these ways, the one you choose is likely to be dictated by the characteristics of your output device and process, such as the number of inks available in one pass.

Angle This box appears only if you are editing a halftone (screened) style. Enter the screen angle you want to use for this separation. See Section 5.5 on page 222 for more details of screen angles.

Note: This box defines a default value, used if the job does not set its own screen angles. If you wish to use angles entered here even when the job requests other values, select the check box **Override angles in job**, also in this dialog box.

Note: If you have one of the optional TrapPro features enabled, you can create sets of trapping rules and apply them within the RIP. From the Eclipse Release of the Harlequin RIP, the ink set options have been removed from the Edit Separations dialog and placed within their own Ink Set Manager. TrapPro and the Ink Set Manager options are fully described in the separate *TrapPro User Manual*.

New Use this button to add a separation for a spot color to the list. A new row appears in the list of separations. Type the name of the spot color into the first text box below the list, to replace the text `New Color`. If required edit the settings for **Print**.

Warning: The name you enter for the spot color must match the one used in the job in every respect: upper and lower case, use of embedded space characters and any trailing `CV` or `CU` suffixes. For example: a typical Pantone specification is `PANTONE 386 CV` but applications may report this in different ways.

Delete Use this button to delete the selected spot color separation. The separation disappears from the list. You cannot delete process color separations.

11.7.2 Other options

There are some other controls in the Edit Style dialog box, not linked so closely to individual separations.

Override separations in job

The separations shown in the Edit Style dialog box always take effect for jobs that do not specify their own separations. If the job attempts to specify separations, you must select the **Override separations in job** check box if you want to produce the separations shown here.

Use Level 1 spot colors

Spot color is not a standard part of the PostScript Level 1 specification. It is a widely used convention that was defined later. If you wish to separate composite jobs using this spot color convention, select this box.

Warning: We strongly advise you not to select this box when defining a separation style to which you will supply preseparated jobs. The box is only enabled if you using a CMYK separation style and not recombining, but you might use a style with these settings and submit preseparated jobs in order to override screen angles or other settings. (You cannot select this box when you are using a monochrome separation style or you have selected the **Recombine preseparated jobs** box.)

When you select this box, the RIP converts conventional representations of spot colors in PostScript Level 1 language documents to the current **PostScript Language compatibility level**. By default, the RIP converts the spot colors to LanguageLevel 3. To convert the spot colors to LanguageLevel 2 style, change the **PostScript Language compatibility level** in the Page Setup Options dialog box.

This check box has an effect only when producing spot colors.

Override angles in job

This box appears only if you are editing a halftone (screened) style. Select this box if you want to ignore any screen angles set in the job. See Section 5.5 on page 222 for more details.

This option is automatically selected when **Recombine preseparated jobs** is checked.

Reject preseparated jobs

If you select the **Reject preseparated jobs** check box, the RIP will not process preseparated jobs. If this check box is selected, then the **Recombine preseparated jobs** check box is disabled.

Recombine preseparated jobs

The **Recombine preseparated jobs** check box allows you to recombine certain classes of preseparated jobs. Recombining may be useful or necessary in a variety of cases: for example, when proofing on a full-color device or retargeting from one kind of final output device to another kind. See Section 11.7.3 for details of the suitable jobs.

From Eclipse Release SP3, this option will activate Recombine 2.

Note: When using this option, the RIP cannot paint partial page buffers; expect jobs with pages requiring large amounts of memory to fail if you have not allocated enough physical memory.

11.7.3 Recombination

The Harlequin RIP Eclipse Release SP3 provides two methods of recombination: Recombine 1 and Recombine 2. Recombine 1 is the recombination method used in previous RIP versions. Recombine 2 is the new version which uses both object and raster methods where appropriate.

Recombine 2 supports the recombination of patterns where previously using Recombine 1 resulted in a rangecheck error.

Other complex objects, such as free-form vignettes, are now recombined where previously using Recombine 1, incorrect output may have resulted if one or more separations were converted to process.

The additional functionality may result in a performance overhead proportionate to the area covered by those objects present in separations which are not being output and instead converted to process.

Recombine 2 is active as the default. If you wish to disable Recombine 2 and use Recombine 1, you should add to the `SW/Sys/ExtraStart` folder a file containing the line:

```
<</RecombineVersion 1 >> setsystemparams
```

When you have done this you should restart you RIP.

There are some limitations on the jobs that the RIP can recombine. There are also some classes of jobs where you should make additional settings.

The limitations listed below are the same for both Recombine 1 and 2:

- The job must consist of process separations, suitable spot colors, where *suitable* is defined in this section, or both. (It is also possible to submit most composite jobs to a page setup using recombination, but see the comments in Section 11.7.4. This ability minimizes the number of page setups that you must create and maintain but has no intentional effect on the composite jobs.)
- The names of suitable spot colors must be unambiguous. If the job supplies a CMYK equivalent for a spot color and the name is recognized by the RIP, that is sufficient for use with recombine.
- When the job does not contain a process equivalent for a spot color, recombine can still be used if the RIP can find a correct equivalent name in a RIP named color database. The RIP searches several files in the `SW/NamedColor` folder for an equivalent. These files define several com-

monly used names, including: other process colors, such as Red, Green, and Blue; spot colors produced by some common job-creating applications; and the `CV` and `CVU` names defined in PANTONE Colors.

Note: Some common names—for example, `Pink` or `Mauve`—can have slightly varying definitions in different jobs, because either the creating application or the designer has used a conflicting definition. One solution is to add a CMYK equivalent in the job where such a name occurs.

In short, CMYK equivalents for spot colors must exist either in the job or in a RIP named database.

- The job must contain all the required separations in one file or AppleTalk connection. It is not possible to recombine jobs where each separation is in its own file.
- Where the job contains more than one set of separations, separations from each set (or page) must appear contiguously—for example each page (or set) should appear in the order, KCMYDE (where D and E represent spot colors). That is, KCMYDE for the first page, KCMYDE for the second page and so on. The pages must not appear ordered by colorant. For example: the order KKK…CCC…MMM…YYY… DDD… EEE… is *not* allowed. Where there is only one set (or page) of separations in the job, the order of separations in the job is unimportant: for example, CMYKDE and KCMYED are both acceptable.

The additional settings for recombined jobs are:

- The **Override angles in job** option is automatically selected when **Recombine Preseparated jobs** is selected. It is highly recommended you leave it selected. In the Edit Style dialog box set the angle you require for each separation. See Section 5.5 on page 222 for details.
- It is highly recommended that the **Override dot shape in job** option is selected.
- It is highly recommended that the **Override frequency in job** option is selected.
- You can also override other screening features if you wish.

11.7.4 Recombination and composite jobs

Recombination is a powerful capability of the RIP. In many cases, it is possible to submit both composite and preseparated jobs to a page setup that has **Recombine preseparated jobs** selected. However, there are cases where the nature of the job or other settings made within the RIP mean that it is necessary to create separate page setups for composite and preseparated jobs.

Neither Recombine 1 or 2 can be selected in a page setup which makes use of the `HqnImpose2` procset. This includes use of the page features: `Fill Film`, `2 up`, `2 across`, and several example page features. (The RIP detects when this combination is attempted and displays a warning.)

11.7.5 Recombine 2 issues

When recombining preseparated files the **Overprint process colors** options have no effect, even if selected.

When recombing composite files the settings of the **Overprint process colors** options in the GUI are obeyed.

`OverprintProcess`, `OverprintWhite`, `OverprintGray` and `OverprintBlack` user parameters are not applied to recombined objects. Instead, the overprint effect is equivalent to the result of outputting the separations of the job on a press.

When you are using Recombine 2 the **Override color management in job** option will always behave as if it is selected. That is, any color management in the job will be overridden by the color management settings in the RIP.

Recombine 2 does not support separation omission (that is, a blank separations will be output). In addition, Recombine 2 is not currently compatible with RLE Output or Trapping.

11.7.6 Recombine 1 issues

The issues noted in this section relate to Recombine 1 only.

11.7.6.1 Composite files

If you are using Recombine 1 you may have problems with composite files that contain a `setpattern` command. An error message similar to the following may appear:

```
%%[Error: setpattern disabled while recombining - Aborting page]%%
```

The solution to this is to turn Recombine off.

11.7.6.2 Preseparated files

If you are using Recombine 1 you may have problems with preseparated files that contain a `setpattern` command. An error message similar to the following may appear:

```
%%[Error: setpattern disabled while recombining - Aborting page]%%
```

The solution to this is to turn recombine off.

11.7.6.3 Transparency

If you attempt to use Recombine 1 with a file containing transparency a configuration error will occur.

11.7.6.4 Preseparated duotones

To use a workflow of Recombine 1, to trap, and then separate for film output, you should note the following information.

If you supply a preseparated duotone file where, for example, 100% Cyan (C) and 100% Black (K) are treated as a register color (for crop marks), you will find that when the file is converted to CMYK as recombine must do, you will end up with 100% C, 0% M, 0% Y, and 100% K, which is not a register color.

With trapping applied to the file an autochoke will appear on the crop marks, because the trapping does not see the color as a rich black, register color (100% C, 100% M, 100% Y, 100% K).

Note: To avoid this situation make the crop and register marks in a `begin` or `endpage` PostScript Language procedure. In this case they will be marked as non-trappable.

11.7.7 Closing the Edit Style dialog box

You must close the Edit Style dialog box to save your changes. You must also close the Separations Manager before you can use any other part of the RIP.

Click **OK** to confirm all the changes you have made in this use of the Edit Style dialog box, including any deletions. This confirmation is provisional: you must also click **OK** or **Select** in the Separations Manager to finally save your changes. Click **Cancel** to discard your changes immediately.

11.8 Color Setup

In the Harlequin RIP, Eclipse Release, the Color Setup options have been changed. The Color Options button is removed from the Page Setup dialog box and is replaced by a Color Setup Manager and Color Setup dialog box. The trapping controls appear in the **Trapping** section of the Edit Page Setup dialog box.

This method allows each color setup to be saved and used with any number of page setups. The location of these controls in an independent dialog box allows for UCR and trapping when producing composite color pages (for example when driving a color device directly), as well as in separated output. It also allows for the controls to be made unavailable when inappropriate.

If you wish to create a setup with Color management including, ICC profiles, custom rendering intents or perform press emulation on a proofer, you should use the Harlequin ColorPro option. This option is activated by a password and you should contact your dealer for more information.

If you do have Harlequin ColorPro activated in your Harlequin RIP and you wish to create a setup with color management, you should consult the *Harlequin ColorPro User Guide*.

11.8.1 Define color setups (no color management)

Follow these steps to create a customized color setup. Note that a color setup corresponds to a particular device and color space.

1. Choose **Color > Color Setup Manager**. The Color Setup Manager dialog appears.

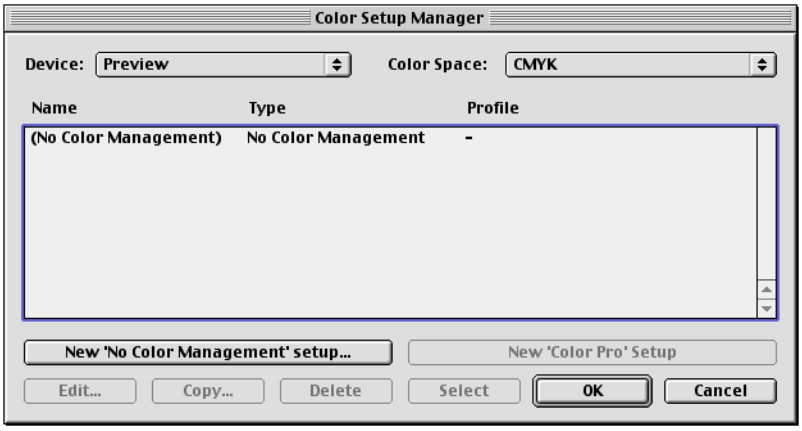


Figure 11.1 Color Setup Manager dialog box

2. In the Color Setup Manager dialog box, select the device for which you want to create a color setup. If you are creating CMYK Separations (halftone), you should select **`Printing Press`** in this option.
3. If necessary, select the color space for which you want to create this color setup. Note that when you create a page setup, the separations style you choose determines the color space of the page setup.
4. At this point you have the option to select either, **New 'No Color Management' setup**, or **New 'ColorPro' setup** (which is only available by use of a password). If you can select **New 'ColorPro' setup**, you should consult the *Harlequin ColorPro User Guide* for more details.

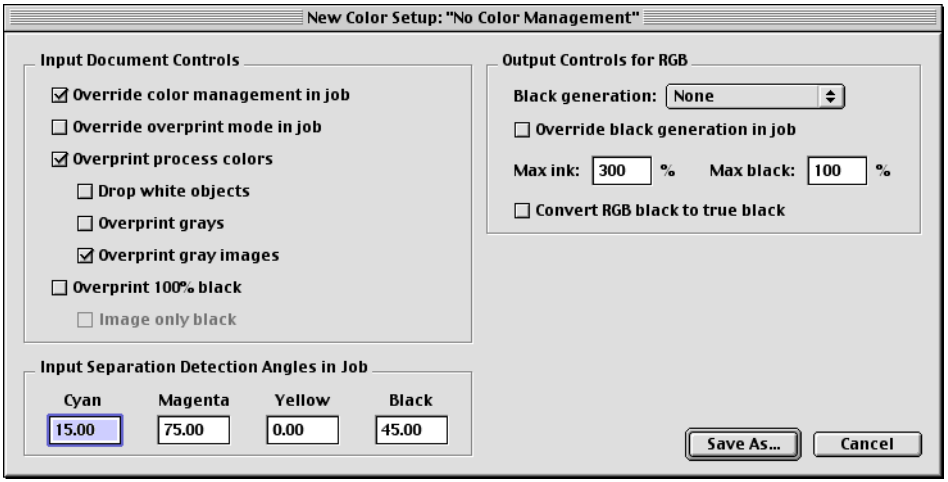


Figure 11.2 New Color Setup dialog box

The following tables describe the options available in this dialog.

Table 11.1 Input Document Controls in the New Color Setup dialog box

Fields	Description
Override color management in job	Select this check box to override any color management supplied in the job and use the options set in this dialog box. If you do not check this box, the Harlequin RIP searches the job for a color space array, embedded ICC profile, or a color space resource. If there is such an element, the Harlequin RIP uses it to transform the relevant object on the page and then treats the object as defined in device-independent color. See Appendix B, "Jobs Containing Color Management Data" for details. **Note**: A PDF / X-3 file containing an `OutputIntents` dictionary will be color managed using the ICC profile indicated by the `OutputIntents` dictionary, as long as the job uses a device independent color space and the **Override color management in job** option is not selected

Table 11.1 Input Document Controls in the New Color Setup dialog box (Continued)

Fields	Description
Override overprint mode in job	There is a new PostScript operator called **setoverprintmode** which is the PostScript equivalent of the PDF gstate **OPM** flag. If an object is set to overprint and **OPM** or **setoverprintmode** is on, the Harlequin RIP drops any colorants which have a zero value. This is called "implicit overprinting". This is what the **Override overprint mode in job** option controls. If the **Override overprint mode in job** option is checked, the **Overprint process colors** option (described below) is always honored and any **overprintmode** and **OPM** parameter in the job is ignored. If it is not checked, any **overprintmode** and **OPM** parameter in the job will be used and the **Overprint process colors** setting will be used as the default value.
Overprint process colors	If this option is selected and overprinting is switched on for an object, the RIP overprints any process color component defined as **0** in the CMYK color space, or as **1** in the RGB color space. That is, the component is treated as transparent. When this option is not selected, a process color component produces a knockout on the separation. However, if overprinting is switched on for an object, the RIP overprints colorants that are explicitly set to overprint using the Harlequin extension to **setcmykcolor**.

Table 11.1 Input Document Controls in the New Color Setup dialog box (Continued)

Fields	Description
Drop white objects	When **Overprint process colors** is selected, **Drop white objects** determines how the RIP handles white objects: objects defined as **`0 0 0 0 setcmykcolor`**, **`1 setgray`**, or **`1 1 1 setrgbcolor`**. If this option is selected and overprinting is switched on for that object, the white object simply disappears from the separations. If this option is not selected, the white object knocks out underlying objects, even when overprinting is switched on. By default, this option is not selected.
Overprint grays	Select this object to enable the Cyan, Magenta, and Yellow colorants to be overprinted rather than knocked out when a color is specified as gray (with the PostScript language **`setgray`** operator or spot color converted to a gray level) and the job requests overprinting. This behavior is not defined by the PostScript language, and though it is unusual for a job to rely on it, sometimes a job will assume this, especially when the gray tint arises from a named Black spot color which is converted to process.

Table 11.1 Input Document Controls in the New Color Setup dialog box (Continued)

Fields	Description
Overprint gray images	Overprint behavior changed from Harlequin RIP version 4.1 to 5.x and beyond. While the old behavior is deemed incorrect, there is a desire to selectively use the old behavior because of the unpredictability of some graphic applications and to provide for end-users the ability to handle legacy work. The user parameter is called **`OverprintGrayImages`**, with a default of **`true`** which when set overprints gray images. If it is set to **`false`**, gray images will knock out of CMY backgrounds.
Overprint 100% black	When this option is selected, the RIP overprints 100% black rather then generating knockouts in the other separations. The black channel or separation is generated as normal but, depending upon the characteristics of the other inks, may need to be applied last in the combination process so that it overprints all colors necessary. If this option is selected, overprinting occurs regardless of whether overprinting is switched on for that graphics object. How the overprinting of the other separations is done depends on the **Image only black** option. There is no performance penalty incurred by using this feature—in fact, it may be slightly faster to overprint, given that knockouts do not have to be calculated. This feature only applies to black objects, not to individual pixels of a continuous tone image that happen to be 100% black.

Table 11.1 Input Document Controls in the New Color Setup dialog box (Continued)

Fields	Description
Image only black	This option controls whether solid black objects appear in the process color separations other than Black when the **Overprint 100% black** option is selected. If this box is selected, the RIP ignores the other process color components of black objects and no trace of the objects appears in those separations. If this box is not selected, then the other process color components are taken into account. If this box is not selected, the objects appear in any separation where the color component is defined as non-zero in the CMYK color space (or not **1** in the RGB color space). Process color components defined as **0** in the CMYK color space or **1** in the RGB color space are always overprinted.

Table 11.2 Input Separation Detention angles in Job options in Color Setup dialog box

Fields	Description
Cyan **Magenta** **Yellow** **Black**	The angles specified in these fields help the ColorPro application detect the individual plates within a job. The default angles will usually work. If you do change one of these values, for example Cyan to 30.00, and the incoming job has Cyan at 15˚, you will encounter problems.

Table 11.3 Output Controls for RGB options in the New Color Setup dialog box

Fields	Description
Black generation	This is the process of computing how much, and where, black should be added to the image. This option determines how much black ink should be used to reproduce colors. Select **`Ignore`**, **`Minimum`**, **`Light`**, **`Medium`**, **`Heavy`**, **`Maximum`** or **`UCR`** from the menu. *Undercolor removal* (UCR) is the process of reducing the amount of other colors present where the black is added.
Override black generation in job	Rarely, a job will specify black generation itself. You can force the scheme set in the Color Setup dialog box to override those set by the job, by selecting this check box.
Max. ink	This value constrains the maximum amount of all four CMYK colors that will be generated in the conversion process. Similarly, colors specified explicitly as black are not affected by this.
Max. black	This value is the maximum amount of black ink that will be generated by the color conversion process. Note that colors specified explicitly as black are not affected by this setting.
Convert RGB to true black	Some applications, and especially Microsoft® Word, use RGB colors for everything, including solid black—coded as **`0 0 0 setrgbcolor`** (or **`0 0 0`** in a **`DeviceRGB`** color space). You should choose this option to force the RIP to intercept blacks coded in this way and convert them to (**`0 0 0 1`** in) a CMYK color space.

After setting options in the New Color Setup dialog box, click **Save As** and assign a name to this color setup. The Color Setup Manager dialog box displays the new color setup that you have created. Note that you can also Edit, Copy, and Delete color setups from the Color Setup Manager.

5. Click **OK** to confirm all the changes you have make in the Color Setup Manager and New Color Setup dialog boxes.

The **OK** button saves the changes you have made and closes the Color Setup Manager. If you opened the Color Setup Manager from the Edit Page Setup dialog box, you can also save the changes by clicking the **Select** button. In addition to saving the changes, the **Select** button displays the selected color setup in the Edit Page Setup dialog box. Click **Cancel** to discard all changes.

11.8.2 Overprinting controls

Where 100% process black is present and in other circumstances, you may wish to perform overprinting rather than causing knockouts in the other separations. This applies both to composite color output and to screened output. (See “Knockouts and overprinting” on page 427 for an introductory discussion.)

11.8.3 Black generation and undercolor removal

With regard to the CMYK color space, in principle, all colors can be represented with cyan, magenta, and yellow. In practice, however, the theoretically correct combination of these three colors will not produce the color expected when printed, because of the limitations of inks.

To overcome this practical problem, pure black ink is used to improve color reproduction on the printed page. This is the role of the K or black separation. Black is added to produce pure black on the page, because using a combination of cyan, magenta, and yellow usually gives dark brown, rather than black, when printed. Therefore, black text is printed with black ink.

Black is also added in color regions of an image to strengthen color tones. The application of black can often be very effective for improving an image. The amount used can be varied according to the effects you wish to achieve.

Black generation is the process of computing how much, and where, black should be added to the image.

Note: If you have Harlequin ColorPro available, it is able to add black in ways more subtle than the controls described here, using Color Rendering Intents. See the separate *Harlequin ColorPro User's Guide* for details.

When converting color descriptions expressed in RGB (or in HLS, device-independent color, or other spaces which end up as RGB) to CMYK for printing, the RIP must decide how much of a color is to be represented by black ink, and how much by the others. Because a perfect theoretical description of the color image is provided by the CMY components, if black is added without the appropriate removal of some of the cyan, magenta, and yellow, the color produced on the printed page will not be the one intended.

Undercolor removal (UCR) is the process of reducing the amount of other colors present where the black is added. The legend *ucr* represents undercolor removal in the graphs later in this section.

Note: The black generation settings in this dialog box operate in the RIP without Harlequin ColorPro. With ColorPro enabled, an alternative method is normally used. The settings made here are used with ColorPro only when sending RGB data direct to a four-color device, without first converting to a device-independent color space.

11.8.4 Black generation

You can specify how black generation and undercolor removal should be done in the New Color Setup dialog box. The settings in this dialog box control the way the RIP will apply black by constructing internal calls to the PostScript-language operators `setblackgeneration` and `setundercolorremoval`. The dialog box offers a number of black generation schemes. Factors that you should take into account when selecting a scheme include the qualities of the various inks (discussed in Section 11.8.5 on page 463) and printing media.

The scheme used is controlled by the **Black generation** pop-up menu. The options are:

- Ignore

- Maximum
- None *(the default)*
- Light, Medium, and Heavy
- UCR

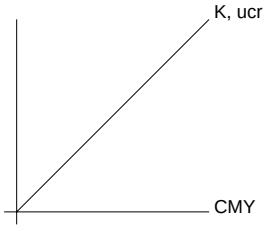
Sections 11.8.4.1 through 11.8.4.5 describe these options.

Rarely, a job will specify black generation itself. You can force the scheme set in the dialog box to override those set by the job, by selecting the **Override black generation in job** check box.

11.8.4.1 Ignore

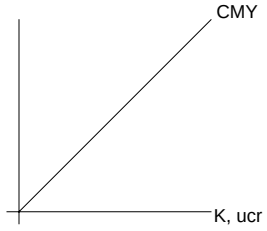
This option does not set black generation and undercolor removal. It replaces as much color as possible with black, while maintaining the intended color, irrespective of ink densities. Because no PostScript-language code for performing undercolor removal is generated, it is the fastest method.

11.8.4.2 Maximum



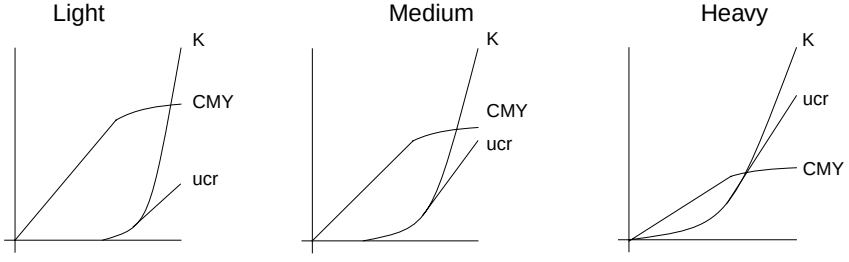
This option introduces a lot of black, taking into account the maximum black ink density. Specify the maximum black ink density in the adjacent **Max black** text box as a percentage value, as described in Section 11.8.5 on page 463.

11.8.4.3 None



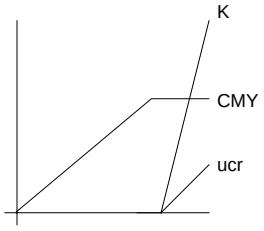
This option performs no black generation or undercolor removal. Black is represented as a mixture of cyan, magenta, and yellow, leaving only those colors expressed explicitly in the PostScript-language job as black—rather than as a mixture of red, green, and blue, or as device independent color—to be rendered on the black separation.

11.8.4.4 Light, Medium, and Heavy



These options introduce black gradually, according to exponential functions, with proportionately smaller amounts of black added and color removed for the lighter colors than the darker ones. This is again subject to the constraints of maximum ink densities, specified in the adjacent boxes. See Section 11.8.5 for details of controlling these ink densities.

11.8.4.5 UCR



Instead of an exponential curve, this option adds no black until the maximum colored ink density is reached and then adds black linearly up to its maximum. The maximum colored ink density is the maximum ink density value minus the maximum black density value. See Section 11.8.5 for details of controlling these ink densities.

11.8.5 Ink densities

Most of the black generation styles are affected by the ink densities set in the two Max ink and Max black options in the black generation section of the Color Setup dialog box.

You should select these values with consideration for paper and press characteristics.

11.9 Color separation angles in job

The RIP sometimes needs to identify which colors are represented in jobs: for example, when recombining a preseparated job. Often there are well structured identifiers that give the answer directly and unambiguously.

Where there is not an obvious identifier, the RIP analyzes the contents of the job to decide a likely color. The screen angle is one of the items that the RIP analyzes.

Under the label **Color separation angles in job**, set the **Cyan**, **Magenta**, **Yellow**, and **Black** text fields to the screen angles that the incoming job uses for these colors.

Note: The angles in this section are the screen angles expected in the incoming job, *not* the angles used for output. The angles used on output are set in the Edit Style dialog box, and can be entirely different.

11.10 Trapping features

Trapping options are found in the **Trapping** section of the Edit Page Setup dialog box and gives some control over trapping; that is, overprinting edges of objects in the output to avoid white gaps showing when printed due to slight misregistration.

If your copy of the RIP has the one of the optional TrapPro features enabled, you can create sets of trapping rules and apply them within the RIP. TrapPro is fully described in the separate *TrapPro User Manual*. (You must enable TrapPro or TrapProLite by obtaining a keyword and selecting the `TrapPro` or `TrapProLite` item while following the procedure described in Section 5.11.1 on page 245 of this manual.)

Making full use of trapping in the RIP can require the choice of appropriate options both in the applications creating the PostScript-language job and in the RIP.

From Harlequin RIP Eclipse SP1, PDF jobs containing PJTF (Portable Job Ticket Format) structures that detail trapping parameters are supported with respect to making the parameters available to TrapPro and TrapProLite. Previously, PJTF structures were ignored. Therefore, if TrapPro is enabled (that is, just the password entered, not necessarily any parameters set established via the GUI), a PDF job containing trapping parameters (via PJTF structures), will be trapped as dictated by those parameters.

11.10.1 Trapping and QuarkXPress

The Harlequin RIP supports trapping facilities provided by QuarkXPress and its `settrap` PostScript-language extension.

QuarkXPress has the ability to generate arbitrary trapping. It can do so in either of two ways:

- By including explicit overprinted borders in the PostScript-language page description it produces. This method works on all RIPs but may produce large job files.
- By indicating that a capable RIP should generate the trapping. The RIP can do this if you select the `settrap (Quark)` option. The QuarkXPress operator must use a printer description file declaring that the RIP supports this feature. Using this option allows QuarkXPress to generate more compact PostScript code, which saves disk space and may lead to faster interpretation by the RIP.

11.10.2 Controls in the Harlequin RIP

The **Trapping** pop-up menu in the **Trapping** section of the Edit Page Setup dialog box always provides the following options:

`None` This option performs no trapping.

`settrap (Quark)`
Use this option to have the RIP generate overprinted borders according to instructions embedded in suitable jobs by QuarkXPress. See Section 11.10.1 for details of how to produce suitable jobs.

If your copy of the RIP has one of the optional TrapPro features enabled, there may be extra entries in this list and you also can create new sets of trapping rules that also become entries in this list, as described in the separate *TrapPro User Manual*.

11.11 Pages in the Output Controller

In general, the RIP treats separations the same way whether they are the result of processing a preseparated job or the result of separating a composite color job within the RIP.

Depending on the separations style, each page of a composite color job can produce several pages, one for each separation. Once these pages are in the Output Controller, the RIP handles them in the same way as any other pages.

The pages are tagged with their color, which appears after the name in the Output Controller. For example, the job `picture.ps` separated for CMYK printing would have four entries in the queue, as follows:

```
picture.ps (C)
picture.ps (M)
picture.ps (Y)
picture.ps (K)
```

Cyan, magenta, yellow, and black are abbreviated to C, M, Y, and K respectively. Red, green, and blue are abbreviated to R, G, and B respectively. Spot color separations are tagged with the full name of the separation.

11.11.1 Roaming separations

When you view a separation on a color display, using **Roam**, it is displayed in the appropriate color, at least until you choose to change that display color. The Roam window also displays the title of the page, an abbreviation for the color, and the resolution. Cyan, magenta, yellow, and black are abbreviated to C, M, Y, and K respectively. Red, green, and blue are abbreviated to R, G, and B respectively. An asterisk character (*) indicates a spot color separation, and a percent character (%) indicates grayscale.

Shift

You can view a block of several separations at once. Click to select the first one, then hold down the Shift key and click to select the last one.

When you view multiple separations, the colors are overlaid to give an impression of how they will look when combined on paper. For example, in a high-resolution screened picture, you should be able to see the *rosettes* of the

screen pattern. (See Chapter 5, “Screening”, for more discussion of viewing superimposed screens.)

You can roam a separation in a different color, which can be useful, for example, if you want to see the differences between two separations of the same color. To highlight the differences, change the roam color of one page and then roam the pages together. For details of changing the roam color, see Section 11.11.3

For more information on roaming, see Section 4.5.3 on page 128.

11.11.2 Roaming composite pages

When you view a composite page using Roam, by default the RIP shows all the separations in the composite page together.

You can reduce the number of separations that you can see in the Roam or Reduced Roam window using the Roam Options dialog box. See Section 4.5.3.1 on page 130 for details.

11.11.3 Changing the color in Roam

You can inspect and change the colors displayed in the Roam window for the colorants in individual separations and composite page buffers. To do this, select a page buffer in the Output Controller, click **Info**, and in the Info dialog box click **Change roam color**. Figure 11.12 shows the dialog box that appears.

Note: You cannot inspect or change the roam color while you are roaming a page buffer from any page in the same job.

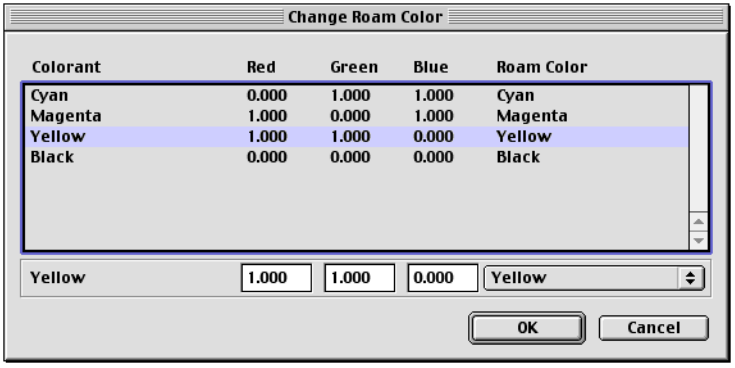


Figure 11.12 Change Roam Color dialog box

The Change Roam Color dialog box appears with a table displaying all the colorants present in the selected page buffer. The columns in the table are:

Colorant This is the name of the colorant in the page buffer. In a separation, there is only one colorant. In a composite page buffer, all the included colorants appear. (Typical composite page buffers contain only process colors but, for a small number of output plugins, there can also be spot colors.)

Red This is the red component of the roam color, in the range 0 (zero) through 1.0.

Green This is the green component of the roam color, in the range 0 (zero) through 1.0.

Blue This is the blue component of the roam color, in the range 0 (zero) through 1.0.

Roam Color This is the name of the roam color. In an unchanged page buffer this is the same name as appears in the **Colorant** column. In a changed page buffer, the color is the

last one chosen for this colorant. You can substitute any other color by choosing from a list of common colors or by typing new values.

To change a color, first select it by clicking on its row in the table. The boxes at the foot of the table display the RGB values and the name of the roam color for the selected colorant. You can choose named colors from a list or specify any other color by RGB values:

- To select a named color, use the pop-up menu for **Roam Color**. The listed values are any special colors represented in this page buffer, a list of default colors for the RGB and CMYK spaces (`Default Red` and so on), and an entry called `Other`. You cannot select `Other`: it shows only that you have edited the RGB values to a color not in the menu. To return to the original roam color for a colorant, use the list to select the name that appears in the **Colorant** column.
- To specify any color not in the pop-up menu, edit the values in the fields for **Red**, **Green**, and **Blue**. Once you have edited a value then, as soon as you move to another field (or select a different row in the table), the **Roam Color** name for the edited colorant changes to `Other`. If you want to edit another color, click on its row. (You can do this for all colorants if you wish; each can have its own value for `Other`.)

Click **OK** in this dialog box and **OK** again in the Info dialog box to save your changes to roam colors. Click **Cancel** in either dialog box to abandon your changes.

Appendix A

Troubleshooting

This appendix provides solutions to common problems that can occur when running the RIP.

The first sections contain information about the warning messages that can appear. They are grouped according to where the messages appear in the RIP.

Section A.1, ": Warning messages and what to do", gives a list of some of the major error messages that may occur when running the RIP. All of the messages in this section appear in dialog boxes.

Section A.2, "Warnings in the RIP Monitor", describes the warnings that appear in the system monitor. They are grouped according to the type of problem.

Section A.3, "Warnings within the progress box", describes the messages that appear in the progress box. The progress box is part of the Output Controller in either of the multiple modes, or a separate window in either of the single modes. This list does not include the warnings generated by output plugins.

The remaining sections provide additional information on specific topics.

Section A.4 on page 485 contains information on imposition and media saving.

Section A.5 on page 486 describes Seybold test timings.

Section A.6 on page 486 describes solutions to problems when imaging TIFF/IT files.

Section A.7 on page 488 describes solutions to problems when imaging PDF jobs.

Section A.8 on page 494 describes solutions to network problems when configuring the RIP.

Section A.9 on page 495 describes how to set the access permissions for the spool folder.

Section A.10 on page 496 describes solutions to Macintosh system problems when configuring the RIP.

A.1 : Warning messages and what to do

The following is a list of some of the major error messages that may occur when running the RIP. All of the messages in this section appear in dialog boxes.

A.1.1 Problems with starting the Harlequin RIP

Table A.1 Start-up messages

Message	Problem	Things to try
Disk needs DiskFirstAid	The hard disk may have been corrupted.	Use DiskFirstAid to carry out any repairs necessary. DiskFirstAid is supplied with your Macintosh operating system.
Eve Dongle not plugged in Fatal error: Fatal security device failure	The RIP has not detected a valid dongle.	Check that the dongle is installed and plugged-in correctly, and that the EvE Init start-up document is installed in the system folder. If this does not help, shut the Macintosh down, disconnect the dongle completely, and reconnect it. Power-up the Macintosh again.
The RIP failed on bootup	An error has occurred while the RIP was starting up.	Reset the RIP to the factory defaults. Reboot the machine and reduce the number of applications (including INITs or system extensions) running.
The RIP startup failed	An error occurred while starting up the RIP.	Reset the RIP to the factory defaults. Reboot the machine. If this does not help, reinstall the RIP.

A.1.2 Problems involving memory or disk space

Table A.1 Memory or disk space messages

Message	Problem	Things to try
Application size is too small	The RIP has been configured with a default memory size of less than 15360 KB.	Change this by choosing Get Info… from the Finder menu, or by pressing Command-I, with the RIP icon selected. It is theoretically possible to run the RIP with a memory size of smaller than 15360 KB, but performance may decline. The amount can be increased to much higher values if necessary. Note that using System 7 virtual memory may also adversely affect performance, in versions before 7.5.
Not enough memory to run the RIP	The system and other software running on the Macintosh are consuming too much memory.	Reduce the amount of memory being used. When you select About Finder from the Apple menu, before starting the RIP, the Finder should have at least 6.5 MB available. Notable consumers of memory: Disk Cache set too high—64 KB is normally sufficient. Disk Cache *must* be turned on. Adobe Type Manager—this can have a very large cache. Turn it off or set it to less than 128 KB. System—this may have lots of desk accessories and fonts in it. Use Suitcase II for this, instead of placing them in the system with Font DA Mover (System 6 only). Some other INITs take up large amounts of memory. The application size may be too small (see details for that message). Try quitting other applications.

Table A.1 Memory or disk space messages (Continued)

Message	Problem	Things to try
Warning: Memory is getting low and your RIP is running out of system memory. Therefore … *(continues)*	The RIP cannot obtain enough memory (RAM) to operate correctly. **Warning:** The underlying fault condition can occur in all previous revisions, without a message appearing but causing a variety of problems.	The warning message describes the best corrective action: display the Configure RIP Options dialog box by clicking Options. in the Configure RIP dialog box; increase the Minimum memory left for system (512 KB is the suggested minimum), quit the RIP, and restart the Macintosh before restarting the RIP again. Alternatively, you can reduce the required memory (specifically the heap) by removing any plugins which are installed but not actually being used.

A.1.3 Problems with resources

Table A.2 Resource messages

Message	Problem	Things to try
Could not access a resource for the current plugin device driver	The plugin driver for the current device seems to have been moved.	Reset the RIP to the factory defaults. Move a copy of the device driver into the Devices folder in the SW folder.
Could not access a Setup resource	The setup file has been corrupted or is missing.	Reset the RIP to the factory defaults.
Internal resource not found	The application resource fork has been corrupted.	Reinstall the RIP.

Table A.2 Resource messages (Continued)

Message	Problem	Things to try
There are no devices installed in the setup file	There are no devices installed in the devices folder, and the application resource fork has been corrupted.	Reinstall the RIP.

A.1.4 Problems with files

Table A.3 File messages

Message	Problem	Things to try
Could not open the newly created RIP setup file	This probably means that there are too many other files open.	Close some files.
File too deeply buried inside folders Move it somewhere else	The file pathname is too long for the RIP to cope with.	Move the file that you are trying to access to a point higher up in the file system so that the full pathname becomes shorter.
Incompatible version of the RIP setup file used / Old RIP setup file used	The setup file you are using is associated with a different version of the software.	Find and install a copy of the correct setup file that was supplied with the version of the RIP that you are running (this file must be placed in the SW folder) or reinstall the RIP.
Problem finding file—maybe disk is damaged	The RIP cannot find a file.	Try running a disk repair utility such as DiskFirstAid.

A.1.5 Problems with networks

Network troubleshooting is a necessarily technical operation. Consult your network manager if you have any doubts about your abilities in this area.

Table A.2 Network messages

Message	Problem	Things to try
Fatal Appletalk Error: Duplicate printer: <printer name>	There is already a printer on the network with this name.	Change the name in the Input Controller dialog box. If publishing multiple set-ups, load the offending setup and save it again under another name, then publish that name instead.
Fatal Appletalk Error: -3104 Extraction error	AppleTalk has been turned off.	Change AppleTalk to *active* in the Chooser of the Macintosh running the RIP.
Fatal Appletalk Error: -1097 Too many concurrent requests	The RIP is trying to publish too many names on the network.	When using AppleTalk Phase 1, the RIP can publish a maximum of 20 names. Reduce the number of names published in the Input Controller. Some older operating systems do not support as many names. Upgrade to a newer operating system, or put a new AppleTalk Init in the system folder.
Fatal Appletalk Error: Unable to publish all printers on network	The RIP is trying to publish too many names on the network.	See previous error (Too many concurrent requests).

Table A.2 Network messages (Continued)

Message	Problem	Things to try
Fatal Appletalk Error: Appletalk timeout	The sending application sent no data for longer than the timeout specified in the Configure RIP dialog box.	Check that the network connections are all OK. If this does not help, increase the wait timeout.

A.1.6 Problems with sockets

Table A.4 Socket messages

Message	Problem	Things to try
No communication	Suspect a bad configuration in the receiving or sending application.	Check that both applications are using the same port and that the sending application is using the expected protocol: basic TCP/IP socket stream or Xinet PapConnect, as configured in the Socket Configuration dialog box. Next check the network connectivity using ping or an equivalent network utility program.
Bad jobs at the receiving end	The sending application may not be using the correct protocol.	Check that the sending application is using the expected protocol: basic TCP/IP socket stream or Xinet PapConnect. Check that no other machine is already using the same port and sending something that is not a PostScript-language job. Check that the sending application is using the expected protocol.

Table A.4 Socket messages (Continued)

Message	Problem	Things to try
Missing, bad, or corrupted status messages at the sending machine	The Socket plugin or the port is not configured correctly.	Check that the RIP Socket plugin is configured to return the PostScript-language standard output on the correct port (Address). Check that no other machine is already using the same port and sending something that is not the standard output from a PostScript-language job.

A.2 Warnings in the RIP Monitor

The following warnings all appear as messages in the RIP Monitor. Again, the warnings are grouped here according to the type of problem.

A.2.1 Problems involving disk space

Table A.5 Disk space messages

Message	Things to try
System warning—Insufficient Disk workspace	Create more free disk space before reprocessing the job that gave the warning. It may be necessary to run DiskFirstAid to recover any lost disk space after a Macintosh crash.
Error VMerror Offending Command: renderbands	This appears after a partial paint fails. Make sure that compression is turned on in Configure RIP. If this does not help, free-up some disk space on the Macintosh.

Table A.5 Disk space messages (Continued)

Message	Things to try
System Warning: Free disk space gone below requested limit	The RIP waits for some disk space to be freed. This is not a fatal error. It can happen, for example, if the RIP is outputting pages, or has pages waiting to be output in the Active Queue. When these pages have been output, they are deleted automatically and the RIP continues with its current job. If there are no pages waiting to be output, free up disk space by doing some of the following things: Delete some files. Turn on page compression in the Configure RIP dialog box. Reconfigure the PageBuffers folder by placing it on another disk with more free space. Ensure that there are no locked pages in the Output Controller.

A.2.2 Problems involving fonts

Table A.6 Font messages

Message	Things to try
Error: invalidfont; Offending Command: <command>	Check that the RIP has installed the font correctly. Try proofing the fonts using the Proof Fonts option on the Fonts menu. If the font fails to proof it may be corrupt. If the fonts proof correctly, the job itself may be corrupt. If any job requires a particular font which is not installed, the RIP attempts to use Courier as a substitute.
<FontName> Font not found; using Courier	The font specified in the PostScript-language file is not actually loaded into the RIP. Courier is the default font in this case.

Table A.6 Font messages (Continued)

Message	Things to try
Courier Font not found; using Courier	If this message appears, the RIP currently has no fonts loaded at all. Use Install fonts to install some fonts—the minimum font set that must be installed is Courier, Times, Helvetica, and Symbol. Alternatively, reinstall the RIP.

A.2.3 Problems involving files

Table A.7 File messages

Message	Things to try
ERROR IN CONFIG FILE	The RIP failed to finish interpreting the file. For example, you will see this message if you try to print a TIFF file that is corrupt, unsupported, or of an unrecognized type. This can also occur if a file in the spool folder is locked by another application. Close the file and try again.
Inappropriate compression	This message appears if you try to print a file that has an inappropriate compression format. For example, a color or grayscale TIFF file with CCITT compression. CCITT compression is only suitable for monochrome TIFF files.

A.3 Warnings within the progress box

When appropriate, the progress box may show the following warning messages, together with the accompanying icons. The progress box is part of the Output Controller in either of the multiple modes, or a separate window in either of the single modes.

Output plugins can supply their own warnings and icons, which are not listed here.

Table A.8 Progress box messages

Buffer full
The page buffer on the output device is full

Buffer space low
The output device is running out of buffering memory

Busy
The output device is working on another job

Busy or off-line
The output device is either busy or off-line

Communications failed
Communication between the RIP and the output device has either been broken or was never established

Cover open
The cover of the output device is open

Data transfer failed
Image data transfer between the RIP and the output device has either been broken or was never established

Data underrun
The output device has not received data from the RIP when it was expected

Deleted cassette
The required cassette has been deleted, in the Cassette Manager.

Ink low
The ink supply to the output device is running low

Table A.8 Progress box messages (Continued)

Ink out
The ink supply to the output device has been exhausted

Interface card failed
Communication between the RIP and the interface card in the machine has either been broken or was never established

Invalid clipping
An invalid clipping was requested of the output device

Invalid resolution
An invalid image resolution was requested of the output device

Laser diode failed
The laser diode of the output device is not working satisfactorily

Low power
The output device is low on power

Misplaced cassette
The required cassette is in another output device.

Missing cassette
There is no cassette in the output device

No cassette
The input media cassette requested is not available

No power
The output device has no power

No take-up cassette
There is no take-up cassette for the output device

Table A.8 Progress box messages (Continued)

Not ready
The device is not ready, for an unspecified reason—perhaps unknown or too complex to show. Look for an extra message in the Monitor window.

Off-line
The RIP cannot communicate with the output device

Page stop-started
The RIP has supplied data quickly enough, but the device has stop/started

Paper jam
Media has jammed in the output device

Paper low
The paper or film supply to the RIP output device is running low

Paper out
The paper or film supply to the output device has been exhausted

Printer caught up
There was a data underrun, and stop-start was either not selected or is not supported by the printing device

Take-up full
The take-up cassette is full

Take-up space low
Space in the take-up cassette for the device is running low

Toner low
The toner supply to the' output device is running low

Table A.8 Progress box messages (Continued)

Toner out
The toner supply to the output device has been exhausted

Unknown error
An unknown condition has caused an error

Warming up
The output device is preparing itself for communication with the RIP

Wrong cassette
The wrong cassette is in the output device

A.4 Page imposition and media saving

On wide printers, using the media saving option (described under “Printing effects” on page 175) can save both time and media. You must ensure that you set the media width for the cassette being used correctly, because it is the media width that is used to determine if the rotated page would fit on the media. See “Monitoring media” on page 344 for details of how to set this information.

Some pages may have surplus white space at the sides, and this could mean that film saving will not rotate the page. You can force the rotation in the Edit Page Setup dialog box, and also tell the RIP to center the page if appropriate, so that only the white space is clipped.

It is possible to set up automatic operations such as printing 4-up or 8-up. This is done by adding fragments of PostScript-language code into the system that specify where to lay out the pages. This could, for example, automatically fill a large sheet of film with pages. This form of imposition only works within a single job.

A.5 Seybold timings

The Seybold test timings have to cover a large range of resolutions, so, for example, two printers, with resolutions of 2000 and 2540 dpi respectively, would be compared to one another directly. However, remember that there is more data in a higher resolution bitmap—a 2540 dpi bitmap contains 62.29% more data than a 2000 dpi bitmap. The time taken to generate the 2540 dpi job, while probably not as much as 62% longer, is certainly substantially longer.

If you really must reduce timings to be comparable across different resolution printers, the only solution is to use the lowest resolution possible.

A.6 TIFF/IT troubleshooting

Various problems may occur and warning messages may appear when imaging TIFF/IT files with the RIP. These are described and explained below.

Missing, duplicated, or partial images

> A typical page is described by several files, which can go missing or be in unexpected places. The RIP finds files most quickly if the FP file and the subfiles are in the same folder. It helps to use the correct file extension for each file type.
>
> Duplicated (partial) images may be the result of printing subfiles independently. Select only the FP file, not its subfiles, when you want to print a final page.

Poor image quality

> Files have an embedded resolution, which the RIP must match in its page setup if you want high-quality results. The best way to find the embedded resolution (and page size) is to use a dedicated TIFF file analyzer.
>
> If you try to use too high an output resolution, you will see the following message:
>
> **Output resolution too high for this file. It should be no greater than Clipped images**

The RIP does not take a page size from TIFF/IT files. You must select a suitable page setup before printing the file. Use a TIFF analyzer to discover the page size.

Failure to produce output

```
open: the TIFF 6.0 or TIFF/IT file
is either corrupt, unsupported, of an unrecognised
type or the appropriate file type is not enabled
in Configure RIP / Extras
```

The RIP displays this message if you attempt to image TIFF/IT data types that it does not support or to image files that do not conform to the TIFF/IT-P1 profile.

If you attempt to print TIFF/IT-P1 files when the `TIFF/IT` option is not enabled, then the TIFF 6.0 input option may attempt to process the parts of the file that it recognizes as TIFF. If this message appears then the TIFF 6.0 input option does not recognize any part of the file as TIFF.

Poor performance / Long imaging times

Text in the TIFF/IT file can lead to large numbers of line segments and very large files. See the comments made in “Installation and requirements” on page 323.

Also, if the computer running the RIP is running other applications at the same time, the other applications may be using memory that the RIP could use to operate more quickly. Shut down any programs that you do not need, then stop and restart the RIP to be sure that it is using as much memory as possible.

Problems with SCID files

Standard Color Image Data (SCID) primary data files are incompatible with the TIFF/IT support in the RIP, but SCID alternate data is compatible. SCID primary data is incompatible because it uses the dot range 28 through 228. (See the “Glossary” on page 525 for an explanation of dot range.) The ISO document DIS 12640 describes the dot ranges and other differences between the primary and alternate formats, but the next paragraph is sufficient to identify both types of data.

Primary data files are named N1 through N8 and S1 through S10, and each is visibly labeled ISO 400 in the image. The alternate data is calculated from the primary data, has a lower spatial resolution, and is visibly labeled ISO 300 in the image. The names of the alternate data files end in the letter A, resulting in the names N1A, S1A, and so on.

A.7 PDF troubleshooting

The methods of control provided by the PDF Options dialog box mean that it is possible to reject PDF files that are valid, but that fail to meet strict criteria such as the PDF/X-1 specification. It is also possible for PDF jobs to be badly constructed or for required external files to be missing or in the wrong location. Always inspect the RIP Monitor window or log file if you see problems with printed output.

You may see the following effects or messages.

No pages printed

Check in the PDF Options dialog box that the PDF job is of the required type (for **Accept type(s)**) and that it contains at least one page matching the pages or ranges in the **Pages** field.

Poor color matching

Check that you have an appropriate match of color spaces and management in the PDF job and in the page setup in use. If the problem appears in an image, also check that it is not a low-resolution OPI preview being used to substitute for a missing OPI high-resolution image.

Areas missing from the page or printed at low resolution

Check that any files referenced by OPI are present and that OPI is enabled in the RIP. (Files referenced by OPI must be embedded in a PDF/X-1 file.)

```
%%[ Warning: Skipping page 1 - not in requested page range ]%%
```

This is not an error. It is a reminder that the options chosen in the PDF Options dialog box have caused a page to be omitted from the PDF job being printed. This omission may be intentional.

`%%[ Error: invalidaccess; Offending command: pdfexec ]%%`

The PDF files may have been saved with security settings that require a password to be entered for printing. Obtain the password (from the supplier of the PDF job) and enter the password in the text field in the **Password** section of the PDF Options dialog box. Passwords are case-sensitive.

If you enter the correct password (in the Harlequin RIP) and still see this error, check that you have not entered one or more white space characters at the end of the password. Another possible cause of this error is that the password uses characters from an extended (non-ASCII) character set. The way in which these characters are represented can vary from platform to platform and the PDF password may have been set on a platform different from the one on which you are running the RIP. Request a new file using a simpler password.

Finally, the PDF file may be damaged. Try using another application to view or print the file, taking note of any messages given by that application.

`High resolution file is embedded in PDF job file.`

This is not an error nor a warning. It is information about the structure of an OPI job. This message is most likely to occur when processing a PDF/X-1 job, but could occur for a basic PDF file.

`****** PDF/X-1 Error:` *`text explaining the reason`*

The job is not a valid PDF/X-1 job. See the following messages for explanations of the various reasons that can appear in messages of this form. The RIP may be able to process the job as a PDF 1.3 file, if you have allowed this by a choice in the **Accept type(s)** list.

Note: If you have used a creating or editing application that claims to be compliant with PDF/X-1:1999, you should report these errors and warnings to your supplier of that tool. The RIP performs strict checking of referenced files as well as the basic PDF content of a PDF/X-1 job.

Note: RIP versions 5.3 and 5.5 included support for PDF/X-1:1999, this has been dropped in Eclipse Release and later RIPs, and replaced with support for PDF/X-1a:2001 and PDF/X-3:2002.

```
****** PDF/X-1 Warning: Clipped out 'stroke' operator in EPS
```

The job deviates from the file PDF/X-1 standard—in this example because of a PostScript-language operator used in a referenced EPS file. (The operator is illegal in an EPS file referenced from a PDF/X-1 job but harmless in this context.) Any message starting "`PDF/X-1 Warning:`" has some problem, for the reason given in the rest of the message, but will not cause the RIP to abort the PDF job.

```
****** PDF/X-1 Error: Invalid TIFF compression
```

An embedded TIFF file uses a compression method not allowed by PDF/X-1. Many TIFF files use LZW compression, which is not allowed. Ask the creator of the file to recreate the file using an allowed compression method; PDF/X-1 allows an embedded TIFF file to be compressed using the CCITT or (new) JPEG methods.

Note: The new JPEG method is given the TIFF tag value Compression=7 and is expected to be adopted as part of the forthcoming TIFF 7 specification. The new method was designed (by the Independent JPEG Group) to overcome severe problems in the method of JPEG compression as described in the TIFF 6.0 specification, dated 1992. The old scheme used the TIFF tag value Compression=6 and several related but separate fields.

```
****** PDF/X-1 Error: Vector painting operator in EPS: stroke
```

An embedded EPS file uses a vector painting operator. PDF/X-1 does not allow embedded EPS files to contain vector painting operators: `stroke`, `fill`, `show`, and so on.

```
****** PDF/X-1 Error: Invalid alternativeSpace in Separation
                      colorspace

****** PDF/X-1 Error: Invalid base colorspace in Indexed color-
space
```

The PDF job uses an illegal colorspace. PDF/X-1 places restrictions on the alternativeSpace of Separation colorspaces and the base colorspaces of Indexed colorspaces in embedded EPS files.

`****** PDF/X-1 Error: LZWDecode in EPS`

An embedded EPS file uses LZW compression, which is illegal in PDF/X-1.

`****** PDF/X-1 Error: Missing Subtype in EF object`

`****** PDF/X-1 Error: Unknown Subtype in EF object`

`****** PDF/X-1 Error: Subtype incorrect for embedded file`

The PDF/X-1 file must specify the type of an EF object (embedded file) using the Subtype key. The Subtype key can be TIFF, EPS, DCS, and so on. The RIP checks that the Subtype key is present, is one of those allowed, and matches the actual type of the file.

`****** PDF/X-1 Error: Invalid TIFF PhotometricInterpretation`

The PDF job references a TIFF file of an illegal type. Embedded TIFF files must be CMYK, monochrome, or gray scale. PDF/X-1 does not allow RGB, Lab, or other color spaces.

`****** PDF/X-1 Error: PDF referenced from PDF/X-1`

`****** PDF/X-1 Error: JPEG referenced from PDF/X-1`

The PDF job references a file type that is illegal for PDF/X-1. The PDF/X-1 standard allows only TIFF, EPS, DCS, or TIFF/IT-P1 files to be embedded.

The following messages can appear as `Errors` or `Warnings`. They appear as `Errors` if you have set up the RIP to accept only PDF/X-1 jobs.

In most cases, understanding the messages requires detailed knowledge of the PDF specification but all the messages indicate that the job is not PDF/X-1 compliant. If you see these errors when printing PDF/X-1 jobs, you have two alternatives: one alternative is to ask for the job to be re-created in a form that is compliant with PDF/X-1 and wait for that job to be supplied to you; the other alternative is to use a page setup that accepts basic PDF (using the option `Any PDF <= 1.3 as basic PDF`) and print the non-compliant version. (In rare cases, there may be a more fundamental error in a PDF file that prevents you printing it at all; in such cases, you must use a different PDF file.)

```
****** PDF/X-1 Error: unknown PDF/X version
****** PDF/X-1 Error: unexpected PDF/X version
****** PDF/X-1 Error: obsolete PDF/X version
****** PDF/X-1 Error: unexpected PDF version
```

The PDF version number is too low, too high, or otherwise unsuitable for use with this version of the RIP and the settings in use.

```
****** PDF/X-1 Error: missing Info dictionary
****** PDF/X-1 Error: invalid Info dictionary
```

PDF/X-1 jobs must have a valid Info dictionary.

```
****** PDF/X-1 Error: missing trailer ID key
```

PDF/X-1 jobs must have an ID entry in their trailer object.

```
****** PDF/X-1 Error: invalid encryption
```

If encrypted, PDF/X-1 jobs must have a blank User password.

```
****** PDF/X-1 Error: invalid operator
****** PDF/X-1 Error: invalid HTP in ExtGState
****** PDF/X-1 Error: invalid TR in ExtGState
****** PDF/X-1 Error: invalid RI in ExtGState
****** PDF/X-1 Error: invalid TransferFunction in halftone
****** PDF/X-1 Error: invalid colorspace
****** PDF/X-1 Error: invalid file compression
****** PDF/X-1 Error: invalid function type
****** PDF/X-1 Error: invalid halftone type
****** PDF/X-1 Error: invalid pattern type
```

PDF/X-1 files have restrictions on the allowed PDF operators, parameters in the graphics state, transfer functions, color spaces, methods of compression, halftones, and patterns. The job has tried to use an invalid option.

`****** PDF/X-1 Error: missing embedded font`

PDF/X-1 jobs can use only embedded fonts. The job has tried to use a font without embedding it.

`****** PDF/X-1 Error: invalid filespec`

`****** PDF/X-1 Error: invalid embedded filespec`

Files referenced through OPI in a PDF/X-1 file must be embedded within the PDF/X-1 file itself. The job includes OPI references to files that are not embedded.

`****** PDF/X-1 Error: invalid external file`

PDF/X-1 jobs can use external files only for OPI. The job has tried to use an external file for some other purpose.

`****** PDF/X-1 Error: invalid embedded file`

PDF/X-1 jobs can embed a limited number of file types. The job has a file specification that is badly specified for Macintosh, UNIX, or DOS platforms, is not embedded, or where the Subtype of the file indicates that the file is not TIFF/IT, EPS, DCS, or TIFF.

`****** PDF/X-1 Error: invalid PS XObject`

A PDF/X-1 job cannot contain a PostScript XObject (PostScript code embedded in the PDF page description).

`****** PDF/X-1 Error: missing characterised printing condition`

`****** PDF/X-1 Error: multiple characterised printing conditions`

All data in a PDF/X-1 job must be prepared for exactly one characterized printing condition, which is identified using embedded ICC profiles. (A job can embed multiple ICC profiles and each must contain a characterized printing condition but all conditions must be the same.) The RIP reports the first condition to the Monitor window, in a message similar to this example:

`Prepared for printing condition "CGATS TR 001".`

A.8 Network troubleshooting

This section covers solutions to network problems when configuring the Harlequin RIP.

A.8.1 Harlequin RIP fails to publish

If the RIP is not publishing on the network, check the following.

H.1.0.1 Network connections

Ensure that the network cable is connected correctly to your Mac. The easiest way to do this is to check that the Mac can see other things on the network. For example, are any LaserWriters on the network present in the Chooser? If not, check that connections have not been broken due to connectors being removed.

Look particularly for connectors being removed from either of:

- the Printer Icon socket (LocalTalk)
- the thick / thin net connector from the EtherTalk socket.

Restart the RIP once you have checked the connections and corrected any problems with the network cable . Start the RIP, make sure that there is an AppleTalk channel defined in the Input Controller that is `On`, and then choose **Harlequin RIP > Start Inputs**.

H.1.0.2 Network availability

Ensure that the Chooser on the Macintosh indicates that AppleTalk is active. If you have to make AppleTalk active, we recommend that you restart the Macintosh.

H.1.0.3 Is the correct network driver being used?

Ensure that the Macintosh is using the correct network driver (for example, LocalTalk or EtherTalk). Open the AppleTalk or Network control panel to select the network you wish to use.

If you have changed the network driver, we recommend that you restart the Macintosh, since it is possible that some network services may have been disconnected.

H.1.0.4 Is the Macintosh system software installed correctly?

It is difficult to check the correctness of an installation. If you have checked for faulty connections and other causes, the most reliable procedure is to reinstall the software.

The installer offers you the choice of installing over the running system software or doing a full installation as if on an empty disk. Try the first option since it is simple and quick to do: if there is no improvement, do a full installation.

A.8.2 The Harlequin RIP is not picking jobs up correctly

The System software and network drivers on either the printing Macintosh or the RIP Macintosh may need reinstalling. Try reinstalling the System software and any special drivers for your network hardware.

If the RIP is published on the network, but jobs do not get processed correctly, check the following:

Spooler problems
: Some spoolers check for a specific product name. The RIP is set to `LaserWriter-Sim`. If the spooler does not recognize this, it may not send the job to the printer. This name has been chosen to minimize such problems.

A.9 Spool folder problems and considerations

In cases where the spool folder is on a file server (for example, a folder accessible from file sharing or using an AppleShare file server), you must ensure that the RIP has permission to access the shared folder and all enclosed folders.

Access permission for both file sharing and an AppleShare file server means one of the following:

- The RIP is a registered user on the file server, and is granted access to the folder
- The RIP is a registered user in a group on the file server, and the group is granted access to the folder
- The RIP is a registered user on the file server, and the RIP user is the owner of the folder
- The RIP is either a guest user or classed as `everyone`, and the folder has full access permissions

In all cases the granted permissions for the folder must be `Read & Write`, or on earlier systems: `See Folders`, `See Files`, and `Make Changes`. Enclosed folders must also have the same permissions: click the relevant **Copy** button if your operating system displays one.

Please consult your AppleShare file server administrator guide or file sharing guide for more details.

Also, due to System 7 file sharing performance, it is best not to share the spool folder from the RIP Macintosh. File sharing can slow down the RIP Macintosh, and cause printer stop / starts. Sharing a spool folder that is remote from the RIP Macintosh is the best strategy. File sharing may also cause conflicts with the RIP's network server mode.

If you are using a TOPS network, the disk with the spool folder on it must be published read / write.

A.10 Mac OS 9 onwards, and the Harlequin RIP

This section covers solutions to Macintosh system memory problems when configuring the RIP.

Mac OS 9 versions support both built-in and virtual memory configurations. It is worth experimenting with the possible settings, particularly if you find that there is a lot of disk access as the RIP processes jobs.

Note: Do not confuse Macintosh system virtual memory with the RIP virtual memory (VM).

A.10.1 Built-in memory configuration

built-in memory refers to the RAM installed in your Macintosh. You can check your configuration by selecting **About This Computer** from the Apple menu in the Finder.

To make best use of all the built-in memory (RAM) that you have installed in a Macintosh you usually need to change the application size for the RIP. Do this in the Finder by selecting the Harlequin RIP application icon and choosing **File > Get Info** and then increasing the value in the **Preferred Size** text box in the Info dialog box. See the *Installing the Harlequin RIP for Apple Macintosh* manual for advice on how to assign memory to the RIP and various versions of the Macintosh system software.

Mac OS 9 systems that allows you to run more applications at the same time. It expands onto disk space in order to meet applications' demands for built-in memory.

Virtual memory is much, much slower than RAM and the RIP will fail to meet the time demands of almost all physical output devices. The use of virtual memory is not recommended.

Appendix B

Jobs Containing Color Management Data

Settings within the RIP, in the job, and in the images themselves can all control the processing of images in a job. This appendix describes the settings that influence this processing and explains which setting takes precedence in each particular case. Section B.3 on page 501 summarizes this information.

Important: Different rules apply when you are using Color. See the *Harlequin ColorPro Users' Guide* for details.

If you are not using ColorPro, the RIP checks the following for Photoshop and PDF jobs, and allows independent control of what happens.

When processing jobs containing Photoshop EPS images:

- Is the **Override color management in job** option selected in the Color Setup dialog?
- Does the image contain a PostScript color space array?
- Is the `UseCIEColor` parameter set to `true` in the job?

See Section B.1 and Section B.2 for details.

When processing jobs containing PDF files:

- Is the **Override color management in job** option select in the Color Setup dialog?

B.1 Override color management in job not selected

The Harlequin RIP checks for color management information in the image and the job in the following strict order.

- If the image contains a PostScript color space array (Photoshop EPS files only):

  The Harlequin RIP uses the color space array (CSA) to transform the image. It treats the image as a device-independent color image.

- Otherwise, if the **`UseCIEColor`** parameter set to **`true`** in the job:

  The Harlequin RIP uses the **`DefaultGray`**, **`DefaultRGB`**, or **`DefaultCMYK`** ColorSpace resources to transform the image colors. It treats the image as a device-independent color image.

Otherwise, if the **`UseCIEColor`** parameter is set to **`false`** or has no value in the job, the Harlequin RIP treats the job as CMYK or RGB.

B.2 Override color management in selected job

- If the current page setup does not use a color setup:

  The Harlequin RIP checks the setting of the **`UseCIEColor`** parameter in the job.

- If the **`UseCIEColor`** parameter is set to **`true`** in the job:

  The Harlequin RIP uses the **`DefaultGray`**, **`DefaultRGB`**, or **`DefaultCMYK`** ColorSpace resources to transform the image colors. It treats the image as a device-independent color image.

- Otherwise, if the **`UseCIEColor`** parameter is set to **`false`** or has no value in the job:

  The Harlequin RIP treats the job as CMYK or RGB.

B.3 Summmary of options

Table B.1 Current page setup does not use a color management option

Override color management in job	Image contains a color space array	Job contains UseCIEColor set to	Result
Selected		True	Use the DefaultGray, DefaultRGB or DefaultCMYK ColorSpace resources to transform image colors
		False or no value	Treat job as CMYK or RGB
Not selected	Yes		Use the CSA to transform the image
	No	True	Use the DefaultGray, DefaultRGB or DefaultCMYK ColorSpace resources to transform image colors
		False or no value	Treat job as CMYK or RGB

Settings within the Harlequin RIP, in the PostScript-language or PDF job, and in the images themselves can all control the processing of images in a job.

Note: Some options apply only to EPS files produced by Adobe Photoshop.

Section B.5 on page 502 describes the cases specific to PDF jobs.

B.4 PostScript-language jobs and image files

The Harlequin RIP checks the following when processing jobs containing Photoshop EPS images or TIFF / JPEG images containing embedded ICC profiles:

- Does the current page setup use a color management option?

- Is the **Override color management in job** check box selected in the Color Setup dialog box?
- Does the image contain a PostScript color space array? (Photoshop EPS files only)
- Does the image contain an embedded ICC profile?
- Is the **UseCIEColor** parameter set to **true** in the job?

B.5 PDF color management

PDF jobs can use a variety of color spaces, including device-dependent spaces such as **DeviceCMYK**.

Typically, when using device-independent color spaces, PDF version 1.2 files use the **CalGray** and **CalRGB** color spaces and PDF version 1.3 files use the **ICCBased** color space but these usages are under the control of the creating applications — see the Job Options dialog box: for the **Advanced** tab in Distiller 3.0; for the **Color** tab in Distiller 4.0.

Full use of device-independent color requires ColorPro to be enabled.

Note: A PDF/X-3 file containing an OutputIntents dictionary will be color managed using the ICC profile indicated by the OutputIntents dictionary, as long as the job uses a device independent color space and the **Override color management in job** option is not selected.

Appendix C

Using Genlin

Genlin is a utility provided with the Harlequin RIP to read calibration targets generated by the RIP.

C.1 Introduction

Genlin supports these measuring instruments:

- X-Rite 408
- X-Rite DTP41 series
- X-Rite DTP32
- X-Rite DTP34
- X-Rite DTP12
- X-Rite 938

The remaining sections show how to set up and use Genlin, and how to troubleshoot any problems.

- Section C.2 describes set up and use
- Section C.3 on page 508 describes troubleshooting

C.2 Using Genlin

The use of Genlin involves these stages:

- “Starting a work session with Genlin”. This section describes the connections and checks to make before you start measuring targets.
- “Measuring each target”. This section describes the steps involved in using Genlin to measure a target.

C.2.1 Starting a work session with Genlin

Follow these steps to start a session using Genlin:

1. Connect your measuring instrument to the computer using the modem or printer port.

   Note: On Macintosh computers without a built-in modem or printer port, you can use a USB to serial adapter cable. One example is the Keyspan USA-28X USB twin serial adapter. With this adapter, connect the measuring instrument to port 1 of the adapter and ensure that you set the **Port** to `PRINTER` in the Configuration dialog box.

2. If necessary, recalibrate the measuring instrument using the correct calibration plaque or other white reference tool.

   You should calibrate the first time you use an instrument with Genlin, or whenever you change measuring instruments. You should also recalibrate the measuring instrument after periods of storage or heavy use.

3. Start Genlin by opening the application file located in the Harlequin RIP application folder.

C.2.2 Measuring each target

Note: This procedure assumes that you printed an uncalibrated target.

Follow these steps to measure a target using Genlin:

1. Choose **File > Configure** to display the Configuration dialog box, as shown in Figure C.1.

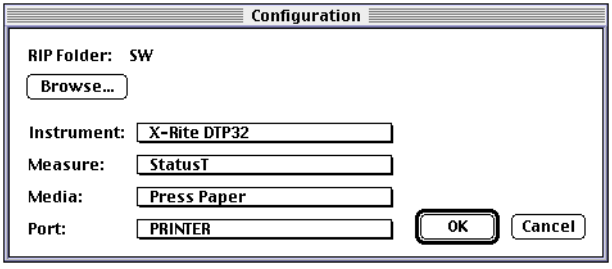


Figure C.1 Configuration dialog box

Select your desired settings, as explained here, and then click **OK**.

RIP Folder Identifies the `SW` folder of the RIP installation that you are using to print targets and import data.

You can read targets that have been created by the RIP running on another computer if you have network access to the corresponding `SW` folder. If you want to do this, click **Browse** and use the file browser to select the `SW` folder of the remote the RIP installation.

The default is the relative path to the `SW` folder of the the RIP with which Genlin is supplied (as shown in Figure C.1).

Instrument A list of supported measuring instruments. Choose your desired measuring instrument and ensure that the correct **Port** setting is selected.

Measure Measurement types supported by your chosen measuring instrument. Choose a suitable measurement type.

Media A list of types of media that targets are printed on, including press and imagesetter media. Choose the type of media that your target is printed on. For example, choose `Press Paper` when using a proofing printer.

Port A list of the interface ports available on your computer. Choose the port to which your measuring instrument is connected.

2. Choose **File > Read Target**, select the number of the target that you are reading (printed as `Reference Number: N` on the target) and click **OK**.

3. In the Read Target dialog box, choose which channels you wish to measure, as well as the filter type and measurement type that you wish to use.

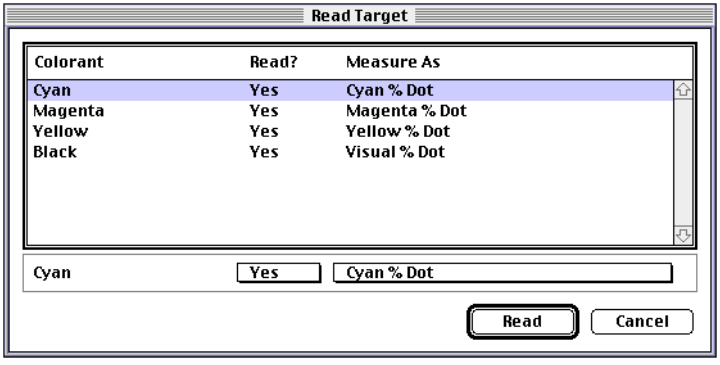


Figure C.2 Read Target dialog box

To do this, select the channel you wish to edit and choose `Yes` or `No` from the menu below the **Read?** column. If both your measuring instrument and target support more than one measurement system you may also have a choice of alternative filters and measurement types in the menu below the **Measure As** column. For example, choose `Cyan % Dot`, then click **Read**. See Section 10.12.5 on page 415 for details of measurement types.

4. Measure the target by referring to the details for your type of measuring instrument. If you have repeated problems reading a patch or strip see "Troubleshooting" on page 508.

   In particular, you must follow the screen prompts to measure the target. Note that when using the DTP32 and DTP34 devices you must click **OK** in the Confirm to proceed dialog *before* loading the target. For DTP41 devices, you should click **OK** *after* inserting the target.

   Strip-readers and other semi-automatic instruments

   Ensure that you scan the target in the right direction. When reading strips, the instrument should be positioned so that approximately an inch of blank paper is available at the end of each strip. Try to avoid any marks outside the area of the patches, such as the strip numbers.

   You may see a `Bad reading` message appear if the instrument has been unable to correctly measure the strip: if so, click **OK**. If you wish to retry reading the strip, click **Yes**, align the strip with the instrument and click **OK**. Click **No** if you wish to abandon measuring the target.

   Manual instruments

   Follow the screen prompts to measure the target. If you are using a manual instrument such as the X-Rite 938 you will also see prompts in the display panel of the instrument to read individual patches within strips. For example, the prompt `Move to: C100` means read the 100% Cyan patch.

   Choose **File > Abort Target** if you wish to abandon reading a target.

5. Click **OK** when you have finished measuring the target.

At this point, Genlin has created a data file containing all the linearization data for the target, which you can import into the RIP. (The file is named `import` and is located in the `caldata` folder within the RIP's `SW` folder.)

6. Use the menu option **Output > Calibration Manager** and, in the Calibration Manager, choose the appropriate **Device** and **Color Space** for the target. (See Section 10.11 on page 403 for details of the Calibration Manager.)

7. The next action depends on whether you are updating an existing calibration set or creating a new one. Choose the appropriate action:

   - If you are updating an existing calibration set, select it in the table listing. This *must* be the calibration set that you used to print the target. Click **Edit from uncalibrated target**. The Edit Calibration dialog box appears. Go to step 8.

   - Click **New** if you are creating a new calibration set. Then, if there are entries in the **Profile** menu in the Edit Calibration dialog box, choose the supplied calibration profile that you used to print the target. Enter a **Name** for the new calibration set. You can use the same name as the supplied calibration profile, but omitting the enclosing parentheses—( )—that supplied calibration profiles use; this makes the link between the two profiles more obvious.

8. Click **Import**; see the description on page 417 for more details. After importing the data and making any other settings, exit the Edit Calibration dialog box and Calibration Manager by clicking **OK**.

Warning: You *must* read the values from the data file (or copy the data file to another location) before measuring another target for the same RIP installation. Genlin uses the same file name for every data file so any existing measured data is lost when you measure a new target.

Start again from Section C.2.2 on page 505 to read another target.

Note: If you no longer need to measure any of the targets that you have printed using the RIP, you can choose **File > Purge**. This means that the numbering of targets can restart from 1.

C.3 Troubleshooting

This is a list of some possible error messages and symptoms that you may see, together with suggestions for avoiding them.

C.3.1 Error messages

All error messages are preceded by the details of the measuring instrument. For example, you might see this full message when there is a problem with an X-Rite 938 instrument:

X-Rite 938 Error: No responding device attached to selected serial line

`Error: Unknown response (`*error codes*`) (expected 'X-RITE X')`

There is a mismatch between the **Instrument** setting in the Configuration dialog box and the measuring instrument that you are using. *X* is replaced by the details of the measuring instrument that Genlin tried to connect to. Check that you are using the correct **Instrument** setting for your instrument.

`Error: The USB device cannot be found`

This message appears if Genlin is unable to locate the chosen USB device. Ensure the measuring device is connected to the USB port and is powered on. Ensure also that you have selected the correct **Instrument** and **Port** in the Configuration dialog box.

`Error: No responding device attached to selected serial line`

`Error: The USB device is not responding`

Either of these messages may appear if the measuring instrument does not have any power supply. Check the power supply to the measuring instrument and ensure that it is switched on. If the problem persists there may be a fault with the power adapter or cabling.

`Error: Failed to open serial line. Restart your Mac`

This message may appear if you attempt to read a target after having communication problems. Restart your computer and ensure that you have the correct **Port** setting in the Configuration dialog box and that your instrument is powered on.

`Error: Unknown`

This message may appear if you have used the **File > Abort Target** menu option. This message may also appear if the RIP is unable to recognize the error generated by your measuring instrument. Check any display panel on a manual instrument for more details.

In all cases, you will be asked whether you wish to re-try measuring the target. If the error persists, consider recalibrating the measuring instrument or following advice in the “Symptoms” section.

C.3.2 Symptoms

Failure to communicate with the measuring instrument

This may be due to a mismatch between configuration settings and the actual instrument or interface port used. A break in cabling, or a failure in software between the computer and the measuring instrument may also be the cause of a communication failure. Check the connections and settings in the Configuration dialog box. If these appear to be correct, try switching off or disconnecting the measuring instrument for 30 seconds and then reconnecting it.

Alternatively, Genlin may not be able to communicate with the measuring instrument due to the re-configuration of the interface port by another application. If you think this is the case, close the application that you suspect is causing the conflict. If necessary, shut down and restart your computer.

Failure to read the correct data from the target

A problem in this area is most likely to be a mismatch between the Target file selected in Genlin and the type of target you are physically measuring. First make sure that the number you select in the target list after clicking **File > Read Target** matches the reference number printed on the target itself.

If recalibrating, you may have printed the target on the wrong paper type. Otherwise, you may have read the wrong patches when using a manual instrument, or incorrectly aligned the target when using a strip-reader. Finally, the target may be incorrectly printed or the measuring instrument may need recalibration.

Failure to transfer correct data to the RIP

Ensure that the **RIP Folder** specified in the Configuration dialog box is the path to the `SW` folder of the RIP installation into which you are importing data.

If the **RIP Folder** is correct, this problem may be due to a problem with the content of the `caldata` folder where target and import data is stored. This is very unlikely event but if it happens, delete the `caldata` folder, which is a subfolder of the Harlequin RIP `SW` folder and print the target again.

Note: After deleting the `caldata` folder you cannot use Genlin to read targets created before you deleted the folder—you must reprint the targets.

The reference number printed on the target does not appear in the list when you click **File > Read Target**

This can happen if the target was printed using a different Harlequin RIP installation. Ensure that the **RIP Folder** setting in the Configuration dialog box is the correct path to the `SW` folder of the RIP installation used to print the target.

This can also happen because the `caldata` folder was deleted between printing the file and trying to read it with Genlin—reprint the target and measure the new print.

Appendix D

Harpoon PCI Screening Accelerator

Harpoon PCI is a screening accelerator for the Harlequin RIP consisting of hardware and special control software. The combination of the Harlequin RIP and this hardware and software is able to provide screened output at rates higher than those possible without hardware assistance. Harpoon PCI supports all of the screening types available in the Harlequin RIP: HPS, HDS, and so on.

Harpoon PCI can be used with any screened output (bitmap) plugin.

The Harpoon PCI hardware is one full length card for the PCI bus. The PCI bus is one of several possible buses used to add expansion cards inside modern computers.

You should also have Harlequin RIP software with support for Harpoon PCI.

D.1 Requirements

The main requirement is a computer with a PCI bus slot capable of receiving the Harpoon PCI card, and otherwise suitable for running the Harlequin RIP.

There are no significant changes in the required disk space and memory (RAM) when using Harpoon PCI.

D.2 Installation

Install both the Harpoon PCI card and, if required by your output device, the appropriate interface card into the computer. Follow the normal precautions for personal safety and prevention of electrical damage: these are outlined in the *Harlequin RIP Installation Guide*, but use specific guidance from the manufacturer of your computer.

All communication and control is through the PCI bus connector. Other connectors are for use in manufacturing and test. There are no switches or links on the board that can be set by the user.

There are some mechanical and electrical considerations that can affect where and how you install the card:

- There is a plastic extension bracket fitted to one end of the card: this bracket can stabilize the card in some machines, mostly those fitted with both EISA and PCI buses. You may need to remove the bracket to fit Harpoon PCI into more compact machines.
- The Harpoon PCI card is fitted with a memory card (a SIMM) providing on-card memory. This SIMM may clash with a full length card in the next slot, but the SIMM is sited to make it possible to use a short card in the next slot.
- In all types of machines with more than three PCI slots, there may be minor performance differences between slots. This is because of the electrical implementation of the bus. Try using Harpoon PCI in different slots to determine if there is a difference, and to establish which slot gives the best performance.

  Currently, the Macintosh and compatible computers with this configuration are: the Apple® Power Macintosh® 9500 and 9515; and some configurations of the PowerWave 604 machines.

Use only Harlequin RIP version 4.1 or later with Harpoon PCI. All earlier versions of the RIP cannot use the Harpoon PCI hardware.

D.3 Choosing when to screen

Without hardware assistance, the RIP screens jobs at a fixed point in the output process, as shown in Figure 0.1. All data becomes a screened bitmap at the earliest possible stage.

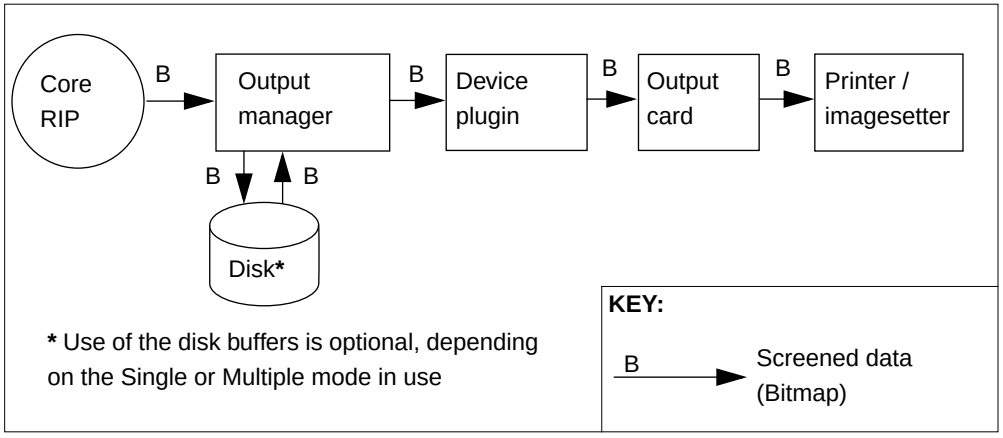


Figure 0.1 Software screening

With assistance from Harpoon PCI, the RIP can screen jobs in two different modes, which differ by screening at different times within the process that produces physical output. By choosing the correct mode, you can select: maximum speed of output; or a lesser degree of acceleration with a guaranteed minimum output rate, which is useful when the output device is sensitive to stop / start operation.

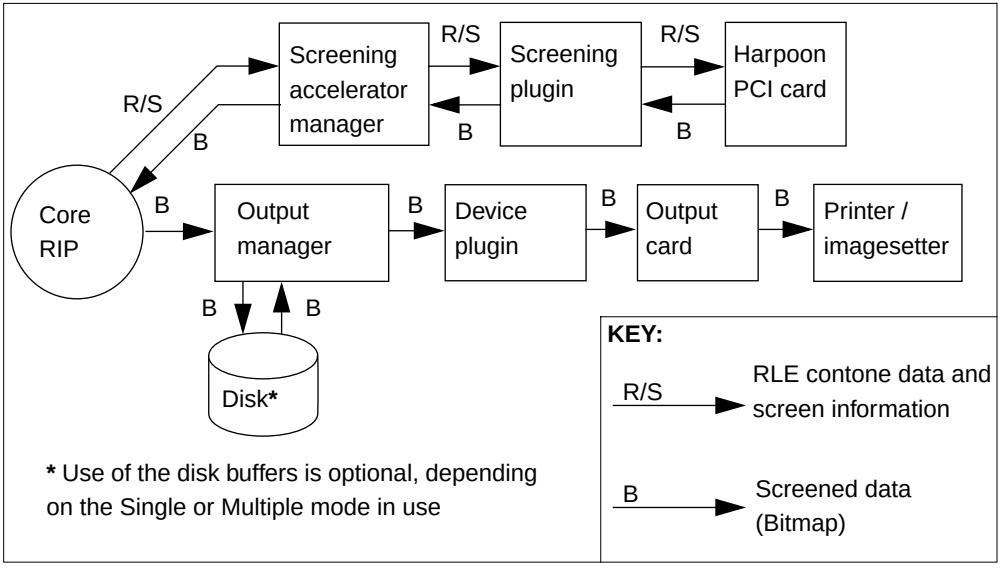


Figure D.3 Hardware screening replacing software screening

The first mode, shown in Figure D.3, performs screening at the same stage as software screening: in the applicable modes, this is before producing the page buffers on disk.

The second mode, shown in Figure D.4, screening at output time, takes place when outputting to the chosen output device, after producing the page buffers on disk. This mode does not involve the core RIP in screening, freeing it to process the next job submitted to the RIP.

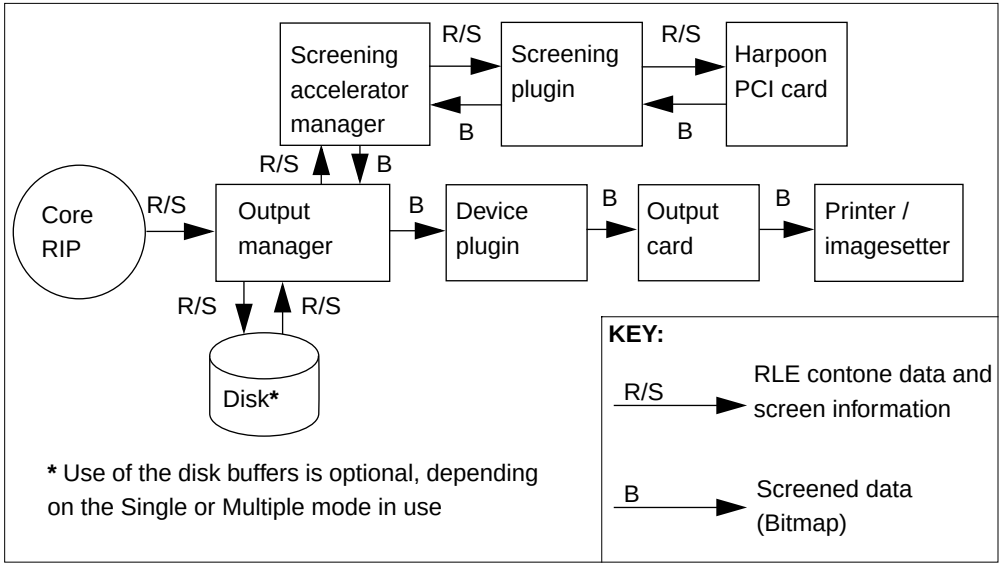


Figure D.4 Hardware screening at output time

When running the RIP in Single or Single (If Necessary) mode, both screening modes are equivalent (and you should choose screening at the same time as software). In Multiple and Multiple (Parallel) modes, you can use either screening mode, but screening at output time is usually faster and is preferred if the output device is not sensitive to stop / start operation.

One of the major differences when you delay screening until the time of output is in the size and format of the page buffer (PGB) files on disk.

- For screening at the same time as software, the page buffer contains bitmap data, which can be large and potentially slower to transfer, but the rate is guaranteed.
- For screening at output time, the page buffer contains run length encoded (RLE) data, which is often smaller than the corresponding bitmap and faster to transfer, but with no guaranteed minimum transfer rate.

Apart from different sizes and transfer rates, another consideration is whether you wish to view the output screening. The RLE page buffers are contone images: that is, unscreened.

Note: The RIP requires more memory to roam an RLE page buffer than a bitmap page buffer, and is slower to display the image. When the RIP is short of memory during roaming, you see the message:

```
Not enough memory to roam this many seps
try using fewer seps or allocate more PrintBuffer
```

To cure this problem, increase the figure labeled **Printer buffer** in the Configure RIP dialog box. Doing this means that you are reducing the memory available to other processes performed by the RIP and you may need to increase the total amount of memory available to the RIP, as described in Chapter 6, "Configuring the RIP".

If you wish to roam a particular buffer that provokes this message and you cannot allocate more memory for use by the RIP, switch to software screening or clear the box labeled **Screen at output time** in the Acceleration Options dialog box, then run the job again.

Choosing whether to screen at the same time as the RIP software screening or at output time is most appropriate varies from job to job. If a job can be output successfully using screening at output time without a stop / start, then it will normally be faster than screening at the same time as software. You can make both choices of screening time available to users—the screening strategy used is determined by the page setup.

D.4 Using Harpoon PCI with the Harlequin RIP

Start up the Harlequin RIP—this will take slightly longer than usual (less than 5 seconds extra). The flashing dots will stop updating for a few seconds while the driver loads.

Select your output device in the Edit Page Setup dialog box and make any required settings.

The Edit Page Setup dialog box contains a button labeled **Accelerate**. The button is grayed out when you have chosen an inappropriate output device or there is no screening plugin.

Choose an appropriate output device and click the **Accelerate** button to see the Acceleration Options dialog box, as shown in Figure D.5.

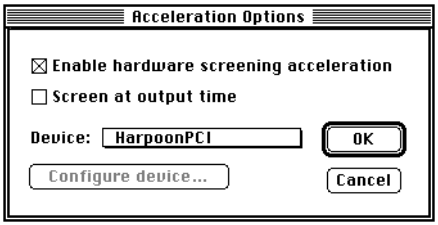


Figure D.5 Accelerate Options dialog box

The Acceleration Options dialog box allows you to choose:

- Software screening
- Hardware screening at the time of software screening
- Hardware screening at output time

To use software screening, leave both of the check boxes clear. This disables Harpoon PCI entirely

To enable Harpoon PCI for screening at the time of software screening, select only the box called **Enable hardware screening accelerator**. Run a job as normal. You should see the following message in the RIP Monitorwindow as the job is processed. (The message continues to appear once for each job making the same use of Harpoon PCI.)

```
Screening accelerator enabled
```

To enable Harpoon PCI with screening at output time, select the box labeled **Screen at output time**. Run a job as normal. You should see the following messages in the RIP Monitorwindow:

```
Screening accelerator enabled
Screening deferred until output
```

The **Device** pop-up menu and the **Configure device** button enable future expansion such as a choice of alternative accelerator devices and configuring your use of alternative or multiple devices. With only a single Harpoon PCI card installed, there is only one entry for **Device**. (The name of the entry is different on different platforms.) At this release, there are no extra options so the **Configure device** button is always grayed out.

Whenever you are using hardware screening with Harpoon PCI, you may see one of two messages.

- If you are using **Generate extra gray levels** in the Edit Style dialog box, and limiting the number of gray levels to 128 or 256, you see:

  `Using 8 bit RLE`

  This message is harmless and means that the RIP is using a more compact form of RLE page buffer to conserve memory and allow faster transfers. There is no loss of image quality, compared to software screening with the same settings. For other use of **Limit number of distinct gray levels**, to 512 or 1024 levels, the RIP uses 10 bit RLE page buffers, again without loss of quality but without displaying a message.

- Any attempt to use more than 1024 gray levels results in truncation to 1024 levels and the message:

  `Warning: Screening accelerator limited to 1024 gray levels`

D.5 Performance gains

Using Harpoon PCI has two possible benefits. Harpoon PCI can reduce the latency—the time taken to start sending output to the output device—and it can increase job throughput sustained over a number of back-to-back jobs.

It is important to realize that Harpoon PCI accelerates only screening, just one of the several processes that transform a PostScript-language job into physical output. In summary, these processes are: interpretation, rendering (of which screening is a part), and output.

There are combinations of jobs, (slow) output devices, and settings in the RIP that can reduce or hide the performance gains possible from using Harpoon PCI.

D.6 Choice of output mode

Harpoon PCI can provide acceleration in all output modes. For testing, the best repeatability is likely to come from using **Single (When Necessary)** and output to the `None` plugin, because this choice eliminates several areas of

background activity that may mask the gain. For output to a real recorder, use the mode that you know works best.

You can perform timing tests using Harpoon in two ways: with the None plugin, or with an actual recorder plugin.

To make a representative test with the RIP, you must be careful to set an appropriate value for **Band size of printer buffer** in the Configure RIP Options dialog box. Choose the value you have established as being reasonable for software screening.

After changing any setting in the Configure RIP Options dialog box, exit and restart the RIP to make sure that the new setting is in use before carrying out any tests.

None plugin
: Using the None plugin shows the true throughput of Harpoon with any test page because the recorder speed is not an issue.

Recorder plugin
: The best test jobs for judging Harpoon are jobs that take longer to render than to output to the recorder. With these jobs, you see the throughput increase when using Harpoon PCI—because the recorder no longer has to wait for the RIP to prepare the page.

D.7 Troubleshooting

You may see the following effects or messages when using Harpoon PCI.

Accelerate button grayed out (in the Edit Page Setup dialog box)
: There may be no screening plugins installed or the output device may accept unscreened output only.

No screens visible when roaming a buffer
: You are looking at a contone image such as the RLE images produced when you use Harpoon PCI to screen at output time.

`Warning: Screening accelerator limited to 1024 gray levels`

This message can appear in the RIP Monitorwindow when the RIP is interpreting a job.

The maximum number of gray levels that the RIP can support when using Harpoon PCI is 1024. This limit applies whether the higher number of gray levels results from the screen having a naturally high number of gray levels or is the result of using Harlequin Precision Screening (HPS) and the **Generate extra gray levels** option.

If a job requests more than 1024 gray levels, the RIP will issue a warning and continue the job using 1024 levels. There should be no significant loss of quality.

`%%[Error: ioerror; Offending command: renderbands; File:` *jobnam*`]%%`
`%%[Error: ioerror; Offending command: showpage; File:` *jobnam*`]%%`

Either of these messages can appear in the RIP Monitorwindow—followed by the RIP aborting the job—when the RIP is rendering a job using screening at output time. If, at the same time, the Output Controller shows that the free disk space has fallen to zero, it is likely that a temporary screening file has filled the disk and the RIP cannot complete the job. (The RIP displays the free disk space figure near the bottom center of the Output Controller, followed by the word `available`.)

To allow sufficient space, you have two options: use one of the following cures and then reprint the job.

For a permanent cure, display the Configure RIP Options dialog box and change the figure shown after **Disk space left for system**. If the previous figure is below 10 MB, add 5 MB to it. If the figure is already much higher than 10 MB, leave it at the higher figure.

For a temporary cure, delete enough files to free 10 MB of disk space and ensure that no more files are created until after the job has completed.

`%%[Error: limitcheck; Offending command: showpage; File:` *jobnam*`]%%`

This message can appear in the RIP Monitorwindow when the RIP is starting to render a job.

See the next message for a combined explanation.

`Error: Screening Accelerator failed to open (output)`

This message can appear in the RIP Monitorwindow when the RIP moves a page buffer to the active queue in the Output Controller.

Both this message and the preceding one, accompanied by failure to render a job, can arise because of other reasons but one cause to consider when hardware screening with Harpoon PCI is that there may be too many screens in use within the page (or set of imposed pages).

There is a fixed limit on the amount of memory that Harpoon PCI can devote to generating screens. This limit is very large compared to typical memory allocations in an unassisted RIP but it is possible to exceed the limit with some jobs.

Each screen uses a variable amount of memory so the point at which Harpoon PCI runs out of memory cannot be given as an exact number of screens. Nevertheless, check the number and types of screens being used in the job.

It is worth trying to simplify the screens first. For example, when using HPS: reduce the number of gray levels to 256; relax the required accuracy by altering the angle and frequency accuracy settings in the Harlequin Precision Screening Options dialog box, as described in “Using the HPS controls” on page 237.

If these simplifications fail to make the job render when using Harpoon PCI, try switching to software screening.

Glossary

This glossary gives a brief description of many of the important terms and concepts surrounding the Harlequin RIP. *Italics* are used to indicate terms with their own entry elsewhere in the glossary.

active device

The active device is the imagesetter or other output device to which the RIP is sending its output. This is the output device specified in the page setup for the job. See also *menu device*.

anti-aliasing

A technique in which intermediate colors or grayscale tones are used to visually smooth boundaries between different colors. Anti-aliasing is most useful at low or medium resolutions and with boundaries between very different colors. The Harlequin RIP TIFF output plugin can perform anti-aliasing, with a control offering choices between more smoothing and faster preparation.

aspect ratio

The height-to-width ratio of a page.

banding

The white bands which can be produced if interpreted data is sent to certain kinds of imagesetter too slowly (see also *data underrun*)—the result is that media continues to feed through, but no image is available to

print, leading to white bands in the output. The RIP uses a printer buffer which ensures that data is sent to the imagesetter at a steady rate, in order to reduce the chances of this problem occurring.

Banding will only occur in imagesetters which cannot stop–start successfully.

black generation

The process of adding black to *CMYK* images in variable amounts according to printing effects required.

cassette

A container for output media. This cassette contains a roll of film or paper and is slotted onto the top of an imagesetter in such a way that the media can be fed through. Some versions of the Harlequin RIP include the Media Manager which allows you to monitor the amount of media left in many different cassettes automatically.

See also *current cassette*.

choke

The process of overprinting a small border on graphics to make them look smaller. *Spread* and choke are often used as part of trapping to protect against misregistration of color separations.

CIP3

CIP3 was a group called International Cooperation for Integration of Pre-press, Press, and Post-press (CIP3). The CIP3 group developed the Print Production Format (PPF) for files to contain information about print jobs including administrative data, information about inks and register marks, comments, and preview images. CIP3 has become CIP4, and maintains a web site at `http://www.cip4.org/`.

CIP4 is a similar group called International Cooperation for Integration of Processes in Prepress, Press, and Postpress, formed to continue the work of CIP3 and to develop a new file format called Job Description Format (JDF).

CMYK

A color representation scheme (or *color space*) where cyan, magenta, yellow, and black are combined to create full-color images.

color separation

A monochrome image that describes a component of a color image that has been described using a particular color space. In printing, images are commonly depicted in the *CMYK* space, leading to four separated pages for each full-color page.

color space

A scheme of representation for color images, such as *CMYK* or *RGB*. Colors are represented as a combination of a small set of other colors, or by other parameters, for example: hue, saturation, and brightness (HSB).

composite font

A font which consists of more than 256 characters. Composite fonts are indispensable for producing images which contain, for example, Japanese text. However, they need to be treated as separate from ordinary fonts.

core RIP

The Harlequin RIP PostScript-language compatible interpreter. This is the program which takes PostScript-language page descriptions as input and produces bitmaps as output.

crop marks

Marks, printed near the edges of an image, which indicate where the paper should be trimmed.

current cassette

The *cassette* feeding media to the output device receiving commands. This can be the *active device* (receiving a job) or the *menu device* (receiving commands from options in the **Device** menu).

current device

The term current device is ambiguous, because it can refer to two different devices.

The *active device* is the imagesetter or other output device to which the RIP is sending its output. This is the output device specified in the page setup for the job.

The *menu device* is the output device that provides the name of the **Device** menu, and receives the commands generated by choosing options from the **Device** menu.

See also *current cassette*.

current color space

When you are creating or editing a page setup, the current *color space* is the color space of the selected separations style.

data rate

The speed that an imagesetter receives data for imaging. It is important that the RIP sends data to the imagesetter at approximately the data rate of the imagesetter, otherwise *data underrun* may result. You can find out the data rate for a particular imagesetter from the instructions for that imagesetter.

data underrun

The result of a RIP failing to supply data to an output device quickly enough. If the *output device* cannot *stop / start* successfully, *banding* or other effects will occur which may cause a loss of output quality.

DCS (Desktop Color Separation)

DCS is Quark Inc's method of image substitution in PostScript-language jobs. The Harlequin RIP supports both DCS 1.0 and 2.0, and the similar OPI scheme.

device driver

A piece of software, often provided by an *output plugin*, that helps the RIP communicate with a particular printer, imagesetter, or other output device. You can link the RIP with any output device, given the correct device driver. This driver could have been produced by you, or by Global Graphics. It is also possible to use device drivers for input devices; see also *input plugin*.

device type

The Harlequin RIP's concept of a *multiple device driver* means that you can use a single *device driver* to run several different imagesetters or other *output device*, rather than requiring a separate device driver for each one. One multiple device driver can run several imagesetters which have the same device type. The nature of the device type depends on the multiple device driver, and is likely to consists of groups of imagesetters. For instance, Ultre may be one device type, and Pelbox may be another.

DLD1 font

The Harlequin RIP's own font format, into which most fonts can be converted. Operations with DLD1-formatted fonts can be performed significantly faster than they would be with normal font descriptions.

dot gain

A printing effect which results in dots being printed larger than they should be. It occurs as a result of ink spreading on the printed page, and if not compensated for, can lead to an image appearing too dark.

dot range

The range of numerical values used to represent color values. TIFF/IT-P1 uses a dot range of zero (0) through 255.

Note: The value 0 may be associated with white and 255 with 100% black or the full density of a particular ink, but this is not essential: in the MP data type, for example, these end values can be associated with particular colors and the intermediate values represent proportionate blends of these two colors.

See also *TIFF (Tag Image File Format)*.

dot shape

The shape in which dots on the image are generated. See Chapter 5, “Screening”.

dpi

Dots per inch. A measure of the resolution of an output device. Dots per centimeter (dpcm) and dots per millimeter (dpmm) are also offered by the Harlequin RIP.

Encapsulated PostScript (EPS)

EPS is a subset of the PostScript language which allows images to be described in a format which can be imported into other documents. EPS images are independent of the format of the document, and so may be imported into documents using a wide variety of applications, from within the application itself, or can even be imported into other PostScript-language page descriptions.

error diffusion

A technique that can be used to screen contone images into a halftone reproduction. The technique works by calculating the error between the required (contone) value and the achieved (halftone) value at each point (which might be a single pixel or a halftone cell), distributing that error to neighboring points, and using the error to modify the contone values for those points. This is repeated for the errors at all points. The result is an irregular and non-repeating screening pattern that shows very little color error.

Error diffusion is easy to implement on low resolution devices but can be difficult to use for high resolution or color output, where the irregularity makes it difficult to predict moiré or dot gain effects. Another problem occurs where the image is rendered in bands, which may be processed in an order that is different to their spatial order: this can lead to visible discontinuities.

The Harlequin RIP does not support error diffusion directly but Harlequin Dispersed Screening has some of the same “random” visual qualities while remaining predictable with respect to behavior on physi-

cal output devices. Also, output plugins can implement error diffusion screening in their output, while accepting contone page buffers from the RIP.

executive

A special mode in some versions of the Harlequin RIP which allows you to type in PostScript-language code and to see the interpreted results. You should only use this mode if you are familiar with the PostScript language.

exposure

Some imagesetters (for example, Pelbox) have an exposure setting which can alter the strength of the laser which produces the image. In these cases, the exposure may be set using the Edit Page Setup dialog box.

feature

A section of PostScript-language code that may be automatically interpreted with any job, specified using the Edit Page Setup dialog box.

font

A set of type characters for use in a textual printing job. Fonts typically contain alphabetical and numerical type, as well as common special symbols (such as marks of punctuation). The Harlequin RIP is supplied with the industry standard 35 fonts for PostScript Level 2, and some special purpose fonts. Users can install third-party fonts as required.

halftone

A complex image which has been broken up into a series of very small dots so as to reproduce it. A newspaper photograph is a good example of a halftone image. See Chapter 5, “Screening”.

halftone cell

A single dot in a *halftone* image.

hard copy

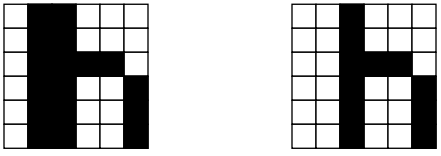
A physical copy of a document, on media such as paper or film.

hardware feed

Some imagesetters will automatically feed through media whenever a job is completed. In versions where the Harlequin RIP's media management facilities are available, the RIP can take account of any devices that do this.

hinted font

When previewing images on a low resolution screen (or when printing them on a low resolution printer) text can look odd when rendered, because of the size of the output pixels becoming significant when compared to features in the characters. Hinted fonts can improve the appearance of text rendered at low resolution or at very small sizes on higher resolution devices.



This figure shows a simple example for the letter *h* in low resolution without hinting (left) and with (right). Here, the hinting has balanced the width of the vertical strokes.

See also *font*.

HDLT (Harlequin Display List Technology)

Provides a programmatic interface for customization between interpretation and rendering. HDLT appears as a password-enabled option but is most likely to be used by your supplier as a way of providing functionality that is not otherwise obvious in the RIP GUI.

HPS (Harlequin Precision Screening)

A proprietary technique used to reduce the effect of moiré interference and improve the quality of a color separated image when using halftones. See Chapter 5, "Screening".

IFD (Image File Descriptor, Image File Directory)

This structure used for each collection of information within a TIFF file, A typical IFD contains several entries, most of which are pairs of tags and values. There can be several IFDs in a TIFF file but the only type of TIFF/IT-P1 file to contain more than one IFD is the Final Page (FP) file.

See also *TIFF (Tag Image File Format)*.

input plugin

A *device driver* which controls an input device connected to the RIP.

Note to OEMS: Several input plugins are provided as standard with the Harlequin RIP, but OEMs can undertake to write their own, or can contract Global Graphics to do so.

Input plugins have several uses—they are primarily used as methods in which input can be sent to the RIP (for example, using a spool folder), but they can also be used as PostScript-language devices or data manipulation filters, and they can be used to perform asynchronous actions.

keyboard accelerator

A set of key presses which have the same effect as a mouse-based operation—such as selecting a menu item—while probably taking less of a user's time to perform.

lpi

Lines per inch. A measurement of *halftone* screen frequency. Lines per centimeter (lpcm) and lines per millimeter (lpmm) are also offered by the RIP.

media

The various materials, such as paper or film, that are used in producing *hard copy*.

menu device

The menu device is the output device that provides the name of the **Device** menu, and receives the commands generated by choosing options from the **Device** menu.

See also *active device*.

mirrorprint

An option in the Edit Page Setup dialog box which allows you to produce a mirror-image copy of your job. See Chapter 4, "Configuring Output Formats".

moiré pattern

A printing effect that occurs when a *color separation* is printed with incorrect screen angles. It is undesirable and can be minimized by the use of correct *screen angles*. See also *HPS (Harlequin Precision Screening)*.

multiple device driver

A *device driver* which can drive more than one output device. Normally, you need a separate device driver for each *output device* you are using. By using a multiple device driver, however, you can use this one driver to run all devices of the types that it supports. For example, one multiple device driver might support all your Ultre and ExxtraSetter devices.

N-color

N-color is a name representing a family of systems of process colors other than the conventional four-color CMYK system (and CMY and RGB). *N* represents a variable number of inks, which can be less than four for economy in simple jobs such as forms printing or more than four for high quality or HiFi color. Examples of N-color systems are the PANTONE Hexachrome Color Selector system and *Photo-ink* technologies.

OPI (Open Prepress Interface)

OPI stands for *Open Prepress Interface* and was originally specified by Aldus Corporation. Systems using OPI enable designers to use relatively low-resolution and easy to handle images on design workstations but to have higher quality images substituted for final output. The RIP supports both OPI and the similar DCS scheme.

output device

A computer peripheral capable of producing printed copy of a document, such as an imagesetter or laser printer. See also *active device*, *menu device*.

output plugin

A *device driver* that controls an *output device* connected to the RIP.

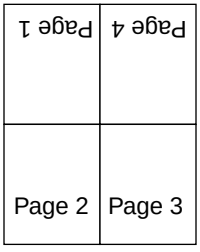
Note to OEMS: Several output plugins are provided as standard with the RIP, but OEMs can write their own plugins or commission Global Graphics to produce custom plugins.

page buffer

A file on disk used to store a page of interpreted output, before it is printed or previewed. Depending on the page buffer mode in which you run the RIP, it can produce page buffers always, or only when required. Once produced, page buffers can either be retained on disk, to allow reprinting; or deleted after printing, to save space on your hard disk.

page imposition

The process of printing several pages, of, say, a pamphlet, on one sheet of media, so as to minimize the amount of trimming that needs to be done. For example, two copies of a four page A5 pamphlet could be produced from a sheet of A3 by printing the A5 pages in the pattern shown in this figure:



The pattern needs to be printed on both sides of the A3 sheet, reversed vertically on one side. Two copies of the pamphlet could then be produced simply by cutting the paper along the horizontal line, and folding

along the vertical line. This process is much simpler than producing and trimming each page separately and rearranging them so as to form a booklet.

Imposition is one of the applications dealt with in the PostScript-language extensions provided by the Harlequin RIP.

Note to OEMS: See the *Using Harlequin RIP Extensions* manual for details.

page setup

In the Harlequin RIP, a page setup is a named collection of settings used to process a PostScript-language job. All page setups are visible in the Page Setup Manager, which allows you to create new page setups and to copy or edit existing page setups. Using the Input Controller, you can create multiple ways of sending a job to the RIP, each with an associated page setup, so that any user can choose an input that applies the desired settings for each job. For full details, see Chapter 4, "Configuring Output Formats".

partial page buffer

An incomplete *page buffer*. A partial page buffer does not yet contain all of the details of the page being rendered. The RIP produces partial page buffers when there is insufficient physical memory to interpret a job while holding a complete page in memory.

PDF

PDF has these meanings:

Portable Document Format. A PDF file describes pages, using graphic capabilities similar to those in the PostScript language. Compared to PostScript-language files, PDF files are typically smaller and more portable to different printers while producing more predictable output. This is the most common usage of PDF.

Printer Description File or *Printer Definition File*. Files, special to a creating application or to the Netware operating system, that define the characteristics of a printer. Many more applications support *PPD* files, which have a similar purpose.

Photo-ink

Photo-ink technologies use different densities (light and dark versions) of one or more colorants. A capable system is then able to use the light ink in highlight areas and the dark ink where more colorant is required. A typical set of colors is light cyan, dark cyan, light magenta, dark magenta, yellow, and black.

pica

A unit of measurement in printing. Usually, equal to 12 points or 0.166 inches.

pixel

A single element of a VDU's display, or of an image.

plug-in module

A software product that can be interfaced with the RIP to provide extra features or customizations.

point

A unit of measurement used in printing. There are 12 points to a pica. Historically, there have been several definitions of the point: a common definition is 0.01384 inches, or approximately 72 points to the inch. The PostScript language uses a default user unit which is *exactly* 1/72 of an inch (0.01389 inches or 0.3528 mm). This unit is frequently called a point, and this is the definition used by the RIP.

PPD

PostScript Printer Description. Each PPD is a file that defines the characteristics of a printer. When installed correctly, a PPD customizes an operating system printer driver or a creation or page layout application to optimize PostScript-language jobs for the printer described by the PPD. Many imagesetter and printer manufacturers provide PPDs for the printers that they produce.

precision screening

See *HPS (Harlequin Precision Screening)*.

prep file

A PostScript-language header file, which is interpreted before the main job processing in order to provide a standard setup to be used by a range of different jobs.

preview

To view an interpreted job on the screen before producing a hard copy of it.

profile

In printing and color science, a profile is a description of the color performance of an input or output device such as a scanner, printer, or display monitor. With suitable software, it is possible to transfer color definitions between different devices, and to have the same colors appear on each.

There is an open standard for profiles promoted by the International Color Consortium (ICC), supported by many device manufacturers and vendors of profile creation tools. The ColorPro color management options within the

RIP are supplied with several profiles and can install additional ICC profiles. There are several types of profile; see the *Harlequin ColorPro User's Guide* for more details.

progressive proof

A *proof* or series of proofs in which (some) intermediate stages of laying down the colors are shown. For example, a CMYK page is usually printed in the order yellow, magenta, cyan, and finally black. The full set of corresponding progressive proofs would be Y, Y+M, Y+M+C, and Y+M+C+K. If the page is to be printed with two passes on a two-color press, the most useful proofs are likely to be the ones representing the product of each pass on the press: Y+M and Y+M+C+K.

proof

A *preview* or *hard copy* of some or all of the characters in a font, or of an image. The RIP can create various forms of proofs—as composite output, as a set of separations, or as a *progressive proof*—to suit the needs of the situation.

Raster Image Processor

See *RIP*.

rendering

The term rendering refers to the process of creating a bitmap image or raster from the interpreted page description. This bitmap can be used by the output device to produce a visible image.

resolution

The degree of detail with which an image is reproduced, usually measured in dots per inch (*dpi*). The higher the resolution, the greater the detail in which the image will be reproduced. The resolution of a computer screen is usually around 72 dpi, whereas an image detailed enough to print in a magazine may be closer to 2500 dpi.

RGB

A color representation scheme (or *color space*) where separations in red, green, and blue are overlaid to create full-color images. The RGB scheme is usually used by computer monitors and televisions, and by some printers.

RIP

Raster Image Processor. A standard term used to name programs or devices which take an image of some description—text, line (vector) drawings, or photographic images—and convert it into a bitmap for display on a computer screen or output on an imagesetter. The final bitmap is the raster referred to in the name.

roam

To preview interpreted jobs in the Output Controller, available only in either of the multiple modes. See also *preview*.

rosette

The pattern in which halftone cells are arranged in a separated image. This figure shows how the RIP can produce rosettes which either have dark centers (on the left of the diagram) or clear centers (on the right of the diagram, with the central dot removed).

screen angles

The angles at which the *halftone* screens are placed in relation to one another.

screen frequency/ruling

The density of dots on the *halftone* screen, commonly measured in lines per inch (lpi). This is sometimes called ‘raster’ or ‘mesh’.

spread

The process of printing a small border just outside the edges of graphics to make them look bigger. Spread and *choke* are often used as part of *trapping* to protect against misregistration of color separations.

stop / start

The ability of an output device to stop and restart during printing.

tag

In TIFF or TIFF / IT files, an Image File Descriptor (*IFD*) contains a number of entries (tags), each consisting of an unique tag number from 0 to 65535, and its corresponding value or values. Tag numbers are generally determined by the TIFF 6.0 or TIFF / IT specifications, and each has a

specific meaning. (In TIFF 6.0, tag numbers above 32767 are vendor defined.) For example, the tag number for the tag named `DotRange` is 336.

throughput

Generally, the efficiency with which images are interpreted and produced. In the Harlequin RIP specifically, throughput is another term for Multiple (Parallel) mode, where interpreting and output are carried out in parallel, and the Output Controller is used to manage the printing of jobs. See Chapter 5, "Harlequin RIP Output Methods".

TIFF (Tag Image File Format)

The basic TIFF file format. Without further details, you cannot assume that something described as being a TIFF file conforms to the TIFF 6.0, TIFF/IT, or TIFF/IT-P1 standards.

Note: TIFF/IT is sometimes referred to as Transport Independent File Format for Image Technology. This name refers to the same format as described in Chapter 7, "Configuring Input".

trapping

Techniques used to tackle undesirable printing effects caused by misregistration of printed separations, optical effects, and so on. See *spread* and *choke*. See also Chapter 11, "Color Separation".

virtual memory

Virtual memory has these meanings:

In PostScript terminology, virtual memory or *VM* is a pool of memory used for the storage of composite objects such as strings, arrays, and dictionaries. PostScript-language compatible interpreters are free to implement VM using all appropriate types of memory in their working environment.

In computer operating systems, virtual memory is disk memory used as an extension to physical memory, built-in memory, or RAM. Many operating systems support the use of virtual memory.

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